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NATIONAL DAM SAFETY PROGRAM. BATAVIA KILL WATERSHED PROJECT DAM--ETC(U)
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READ INSTRUCTIONS BEFORE COMPLETING FORM

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Batavia Kill Watershed Project Dam #1
Mohawk River Basin, Greene County, New York
Inventory No. N.Y. 615

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National Dam Safety Program

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(6) National Dam Safety Program. Batavia Kill Watershed Project Dam Number 1 (Inventory Number NY-615), Mohawk River Basin, Batavia Kill, Greene County, New York. Phase I Inspection Report.

18. SUPPLEMENTARY NOTES

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

Dam Safety
National Dam Safety Program
Visual Inspection
Hydrology, Structural Stability
Batavia Kill Watershed
Greene County
Mohawk River Basin

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This report provides information and analysis on the physical condition of the dam as of the report date. Information and analysis are based on visual inspection of the dam by the performing organization.

Batavia Kill Watershed Project Dam #1 was judged to be safe.

NO. 393 970

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SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

MOHAWK RIVER BASIN
BATAVIA KILL WATERSHED PROJECT
DAM No. 1

I.D. No. NY-615
PHASE I INSPECTION REPORT

TABLE OF CONTENTS

PHASE I REPORT
NATIONAL DAM SAFETY PROGRAM

Name of Dam:	Batavia Kill Watershed Project Dam No. 1 I.D. No. NY-615 (#191c-3901)
State Located:	New York
County Located:	Greene
Watershed:	Mohawk River Basin
Stream:	Batavia Kill (a tributary to the Schoharie Creek)
Date of Inspection:	July 11, 1978

ASSESSMENT

The Batavia Kill Watershed Project Dam No. 1 is a multiple-purpose, recreational and floodwater retarding structure. Although the earth fill structure has impounded water to a depth above the principal spillway crest, no water was being impounded at the time of inspection. Examination of available documents and a visual inspection of the dam did not reveal conditions which are considered to be unsafe.

The total discharge capability of the spillways is adequate for the Probable Maximum Flood (PMF).

LEVEL II

George Koch
Chief, Dam Safety Section
New York State Department of
Environmental Conservation
NY License No. 45937

Approved By:

Col. Clark H. Benn
New York District Engineer

Date: 18 September 78

DOWNSTREAM SLOPE
(looking North)

UPSTREAM SLOPE
(looking South)

BKWP Dam No. 1

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
BATAVIA KILL WATERSHED PROJECT
DAM NO. 1
ID No. NY-615
(#191C-3901)
MOHAWK RIVER BASIN
GREENE COUNTY, NEW YORK

SECTION 1: PROJECT INFORMATION

1.1 GENERAL

a. Authority

The Phase 1 Inspection reported herein was authorized by the Department of the Army, New York District, Corps of Engineers, to fulfill the requirements of the National Dam Inspection Act, Public Law 92-367.

b. Purpose of Inspection

To evaluate the existing conditions of the dam, to identify deficiencies and hazardous conditions, determine if they constitute hazards to life and property, and recommend remedial measures where necessary.

1.2 DESCRIPTION OF PROJECT

a. Description of the Dam and Appurtenant Structures

The Batavia Kill Watershed Project (BKWP) Dam No. 1 is an earthfill embankment having a principal spillway passing through it and two emergency spillways flanking it.

The 74 foot high, zoned compacted embankment has a crest length of 1800 feet and crest width of 21 feet. The upstream slope is 1 vertical on 3 horizontal and the downstream slope is 1 vertical on 2.5 horizontal. The crest and exposed slopes are grass covered. That portion of the upstream slope below the level of the principal spillway crest is riprapped with heavy stone. An earth cutoff trench of varying depth and width keys the embankment to the underlying foundation soils.

The principal spillway consists of a rectangular reinforced concrete drop inlet structure, a 42 inch diameter reinforced concrete pressure pipe with anti-seepage collars, an impact basin, and an outlet channel. Two emergency spillways, one each side, flank the embankment. Both are located in earth cuts and are grass-lined. An internal drainage system consisting of 10 inch diameter perforated abestos-cement pipe is located beneath the downstream slope of the embankment. Seepage is collected and conducted through this drain and outleted through the end walls of the impact basin. The reservoir drain consisting of a 24 inch diameter cast iron pipe extends from the upstream embankment toe to the base of the principal spillway riser. A vertical slide gate mechanism mounted along the inside of the riser controls the flow through the reservoir drain.

b. Location

BKWP Dam No. 1 is located on the Batavia Kill, a tributary to the Schoharie Creek, approximately 0.9 miles Northeast of the village of Maplecrest along Black Dome Valley Road in the Town of Windham, New York.

c. Size Classification

This dam is 74 feet high and is classified as an "intermediate" dam (between 40 and 100 feet high).

d. Hazard Classification

The dam is classified "high" hazard because of the presence of approximately 70 homes and multiple-dwelling units immediately downstream, including the village of Maplecrest.

e. Ownership

This dam is owned by the Batavia Kill Watershed District of Windham, New York.

f. Purpose of Dam

The dam is a floodwater retarding structure and is being adapted to provide recreational facilities in the impounded reservoir area.

g. Design and Construction History

This dam and appurtenant structures were designed by the U.S. Department of Agriculture, Soil Conservation Service (SCS). Construction of the embankment began in 1970 and was completed in 1974. The SCS office having jurisdiction for Greene County has a design folder containing hydrologic, hydraulic, and structural design information, the design calculations for modifications made during construction, and the as-built contract plans and documents.

h. Normal Operating Procedures

Water releases from the reservoir over the principal spillway. This structure has sufficient capacity to discharge a 100 year flood without flow occurring in the emergency spillways. For storms greater than the 100 year flood, flow will discharge through the two emergency spillways.

1.3 PERTINENT DATA

a. Drainage Area (acres)	6144
b. Discharge at Dam (cfs)	
Principal Spillway @ Maximum High Water	322
Principal Spillway @ Emergency Spillway Crest Elevation	301
Reservoir Drain @ Principal Spillway Crest Elevation	81
Maximum Known Flood	273
c. Elevation (USGS datum)	
Top of Dam	1887.0
Emergency Spillway Crest (Auxiliary Spillway)	1877.0

Principal Spillway Crest (Service Spillway)	1844.4
Invert of Reservoir Drain Inlet	1817.0

d. Reservoir (acres)

Surface area @ Top of Dam	139.4
Surface area @ Crest of Emergency Spillway	112.0
Surface area @ Crest of Principal Spillway	26.0

e. Storage Capacity (acre-feet)

Top of Dam	3598
Emergency Spillway Crest	2372
Principal Spillway Crest	307.5

f. Dam

Embankment type: a two-zoned compacted earth fill with an earth keyed cutoff trench.

Embankment length (ft)		1800
Slopes (V : H)	Upstream	1 on 3
	Downstream	1 on 2.5
Crest elevation (USGS datum)		1887.0
Crest Width (ft)		21

g. Spillway

Principal Spillway (Service):

Type: Uncontrolled, reinforced concrete drop inlet (3.5 x 10.5 ft) rising 31 feet; 42 inch reinforced concrete pressure conduit 336 feet long; an impact basin; an outlet channel.

Length(ft): Weir		19.33

Emergency Spillway (Auxiliary):

Type: two grass-lined channels having trapezoidal cross sections

Bottom Width (ft):	North	275
	South	120
Side Slopes (V : H):	North	1:2.5 & 1:3
	South	1:3
Length of level section (in profile) (ft)		50
Exit Slope (V : H)		1:40

h. Regulating Outlet

Reservoir Drain:

Type: 24 inch diameter cast iron pipe with a reinforced concrete inlet.

Control: Mechanically-operated vertical slide gate mounted along the inside of the principal spillway riser.

SECTION 2: ENGINEERING DATA

2.1 DESIGN

a. Geology

The Batavia Kill Watershed Project Dam No. 1 is located in the "Appalachian Uplands" physiographic province of New York State. These

uplands are the northern extreme of the Appalachian Plateau and were formed by dissection of the uplifted but flat lying sandstones and shales of the Middle and Upper Devonian Catskill Delta (395 to 345 million years ago). Relief is high to moderate. Maximum dissection occurs in the Catskill Mountain area where only the mountain peaks approximate the original plateau surface. The present surficial soils have resulted primarily from glaciations during the Cenozoic Era (most recent 65 million year period), the last of which was the Wisconsin glaciation approximately 11,000 years ago. These soils were deposited, in general, directly by the glacier ice and are composed of unstratified rock fragments of all sizes ranging from boulders to clay particles. Locally intercalated lenses of sand and gravel are common where ice-laid and water-laid deposition occurs.

b. Subsurface Investigations

A subsurface investigation was conducted by the Soil Conservation Service, with Mr. Raymond Cope in charge, in the late Spring of 1968. Applicable subsurface information is included in Appendix A. In general, the surficial soils at the project site consist of a thin layer of topsoil and alluvium and/or colluvial deposit over layer of glacio-lacustrine deposit in the flood plain over glacial till over siltstone bedrock to a maximum explored depth of 71.5 feet. Those borings in which the presence of water was recorded indicate the level to range from 1.1 to 8 feet below the ground surface.

No intercalated lenses of permeable sand and gravel were encountered in the borings below the cut-off trench. This trench extends through the permeable alluvial and glacio-lacustrine deposits and is founded on the glacial till.

c. Embankment and Appurtenant Structures

The dam was designed by the Soil Conservation Service who prepared a design report. Twenty five drawings were prepared for the construction of the dam of which portions of several are included in Appendix A.

Hydraulically, the dam was designed to retard the floodwaters resulting from a 100 year frequency storm, without a discharge occurring in the emergency spillways.

2.2 CONSTRUCTION RECORDS

Complete as-built contract plans and documents were available from the SCS office having jurisdiction for Greene County.

2.3 OPERATION RECORD

Since the dam is an uncontrolled, floodwater retarding structure, no operating records are maintained regarding water levels. However, during periods of heavy rainfall, SCS personel do monitor reservoir levels.

2.4 EVALUATION OF DATA

The data presented in this report has been compiled from information obtained from the Soil Conservation Service as well as the New York State Department of Environmental Conservation. It appears to be adequate and reliable for the purpose of the Phase 1 inspection.

SECTION 3: VISUAL INSPECTION

3.1 FINDINGS

a. General

Visual inspection of the BKWP Dam No. 1 and the surrounding watershed was conducted on July 11, 1978. The weather was clear and temperatures ranged in the seventies. The inspection was conducted during a basically dry period during which occasional thunderstorms occurred. The dam was not impounding any water at the time of inspection because the reservoir drain was open. Additional construction work was being considered for improving the recreational potential of the pool area and as dry a work area as possible was being maintained.

b. Embankment

The earth embankment shows no signs of distress. The vertical and horizontal alignment of the crest appears to be unchanged, with no visible surface cracks appearing on the crest or embankment slopes. There was no apparent sloughing, subsidence or depressions occurring either. No noticeable seepage on the downstream slope was observed. No discharges were occurring through the outlets of the internal drainage system. Although no slope protection failures were observed, the heavy stone riprap used resulted in a very irregular sloping surface. No undesireable vegetative growth or animal penetrations into the slopes were observed.

c. Principal Spillway

The principal spillway consists of the vertical drop inlet structure, a concrete pressure pipe through the embankment, an impact basin, and an outlet channel. All of these components were in satisfactory condition *except for the following minor deficiencies:*

1. Hairline cracks in the concrete were evident at the inside corner of the intersection of the vertical drop inlet and the crown of the concrete pressure pipe.

2. Joint separations of less than 0.75 inches at the first two pipe sections downstream of the drop inlet base.

d. Emergency Spillway

Two grass-lined emergency spillways, one on each side and located in earth cuts, flank the main embankment. Both were mowed and in satisfactory condition except for the following minor deficiency:

1. The North emergency spillway's three-tiered cut slope showed an area of minor sloughing on the lowest level tier. Some evidence of seepage was present, but it is not attributable to reservoir storage but probably to hillside groundwater emerging on the cut slope face.

e. Regulating Outlet

The reservoir drain conduit and slide gate are the components capable of regulating the reservoir whenever the pool level is below the principal spillway crest. The slide gate was mechanically repositioned at the time of inspection and found operational, but with some difficulty. Streamflow was passing through the reservoir drain.

f. Downstream Channel

The outlet channel was in satisfactory condition with no severe side-slope erosion or debris obstructions in evidence.

g. Reservoir

There was no noticeable signs of landslides or soil instability in the reservoir area.

3.2 EVALUATION OF OBSERVATIONS

Visual observations did not reveal any problems which would adversely affect the safety of the dam. Although some minor deficiencies were observed, they may be repaired by maintenance efforts.

SECTION 4: OPERATION AND MAINTENANCE PROCEDURES

4.1 PROCEDURES

Normal water surface elevation is at the crest of the principal spillway. Downstream flows are limited by the capacity of the 42 inch diameter reinforced concrete pipe. The reservoir provides 2064.5 acre-feet of storage between the crest of the principal spillway and the crest of the emergency spillways.

4.2 MAINTENANCE OF DAM

The dam and appurtenances are maintained in satisfactory condition by the owner. Normal maintenance consists primarily of mowing the emergency spillway bottoms.

4.3 WARNING SYSTEM IN EFFECT

No apparent warning system is present.

4.4 EVALUATION

Sufficient storage capacity is provided such that controlled release of impounded floodwaters by the principal spillway occurs in a safe manner. The dam and appurtenant structures are satisfactorily maintained.

SECTION 5: HYDROLOGIC/HYDRAULIC

5.1 DRAINAGE AREA CHARACTERISTICS

Delineation of the watershed draining into the reservoir pool area was made using the USGS 7.5 minute quadrangles for Hensonville and Freehold, N.Y. The watershed consists of open grassed fields and woodlands situated in a rural area. Relief ranges from low to steep with the steeper slopes occurring in the upper reaches of the watershed. The shape of the watershed is generally rectangular with the dam located on the short dimension of the rectangle.

5.2 ANALYSIS CRITERIA

The analysis of the floodwater retarding capability of this dam was performed using the "Dimensionless Hydrograph" method of the Soil Conservation Service and recommended spillway design flood criteria of the U.S. Army Corps of Engineers. The SCS method establishes the hydrograph peak inflow. A short-cut, approximation method of flood routing was then used to determine the reservoir storage/peak outflow conditions.

The Probable Maximum Flood 6-hour rainfall of 23 inches was selected using the Weather Bureau TP-40 (Ref. 1). Direct runoff was estimated at 20.3 inches. An SCS curve number (CN) of 80 was used to account for the soil and land use development within the watershed. The time of concentration of 1.34 hours was taken directly from the SCS design report summary.

5.3 SPILLWAY CAPACITY

The principal and emergency spillways are uncontrolled structures. The principal spillway operates under weir or orifice flow conditions depending upon the floodwater inflow to the reservoir pool. During orifice flow operation, pressure flow develops in the 42 inch conduit. The emergency spillways were analyzed as broad-crested weirs having a discharge coefficient, C, of 3.087.

The spillways have sufficient capacity for discharging the peak outflow from the PMF. For this storm, the peak inflow is 49350 cfs and the peak outflow is 45900 cfs. When the spillways are discharging the peak outflow, the water surface will be at the top of dam.

5.4 RESERVOIR CAPACITY

Normal flood control storage capacity of the reservoir between the principal and emergency spillways is 2064.5 acre-feet which is equivalent to a runoff depth of 4 inches over the drainage area. Surcharge storage capacity to the maximum high water elevation is an additional 1226 acre-feet; equivalent to a runoff depth over the drainage area of 2.4 inches. Total storage capacity of the entire dam is 3598 acre-feet; equivalent to 7 inches of direct runoff.

5.5 FLOODS OF RECORD

The maximum known flood occurred during the dam's construction when the pool level was reported as being 20 feet above the crest of the principal spillway. The data for this flood is as follows:

Elev. (Ft.)	Discharge (cfs)
1864.4	273

5.6 OVERTOPPING POTENTIAL

Analysis indicates the total discharge capability is sufficient to prevent overtopping from the PMF.

5.7 EVALUATION

This dam has sufficient capability to impound and adequately discharge floodwaters expected to result from the PMF.

SECTION 6: STRUCTURAL STABILITY

6.1 EVALUATION OF STRUCTURAL STABILITY

a. Visual Observations

No signs of major distress of the dam and appurtenances were observed during the inspection.

b. Design and Construction Data

Design data was obtained from the Soil Conservation Service office in Albany. The results of the stability analyses are listed as follows:

Condition	Minimum Factor of Safety	
	Upstream Slope	Downstream Slope
Immediately after construction	1.31+	1.31
Full Drawdown	1.61	___
Long Term Steady State Seepage from Emergency Spillway Crest	___	1.75

An analysis was also performed using interim conditions between post-construction (no consolidation) condition and the long-term consolidated condition. The results indicated Factors of Safety of approximately 1.3. These interim conditions no longer exist because the embankment has been completed. A summary of the analyses and sections showing the failure arcs are included in Appendix A.

The calculated factors of safety for the BKWP Dam No. 1 are in excess of the minimum factors in the Corps of Engineers recommended guidelines. The dam is therefore considered to have an adequate factor of safety for stability.

Construction data on the dam could not be located. Representatives of SCS stated that they were aware of no major changes during construction.

c. Post-Construction Changes

No changes to the dam and appurtenances that would cause structural stability problems have occurred.

d. Seismic Stability

The dam is located near the boundary between seismic zones No. 1 and 2; therefore, no seismic analysis is considered warranted.

SECTION 7: ASSESSMENT/RECOMMENDATIONS

7.1 ASSESSMENT

a. Safety

The Phase 1 inspection of the BKWP Dam No. 1 did not indicate conditions which constitute an immediate hazard to human life or property. The earth embankment is considered to be stable, structurally, and capable of safely retarding floodwaters resulting from the PMF.

The design of this dam includes an internal drainage system to control the phreatic surface and to provide a safe outlet for foundation seepage.

b. Adequacy of Information

Information concerning the desi and performance of this dam is considered adequate for the purposes required for Phase 1 inspections.

c. Need for Additional Investigations

No additional investigations are necessary at this time.

7.2 RECOMMENDED MEASURES

The following tasks should be undertaken by maintenance forces:

a. Periodic operation and lubrication of the mechanically-operated slide gate mechanism to insure a continued ease of operation of the reservoir drain conduit.

b. Monitoring of the principal spillway hairline cracks in the concrete at the intersection of the vertical drop inlet and crown of the concrete pressure pipe. This monitoring is to insure that any future crack development, if it occurs, may be discovered prior to the need for major corrective action.

c. Periodic inspections of the principal spillway concrete pressure pipe joint separations to determine if additional separation is occurring.

APPENDIX A

DRAWINGS

DAM SITE

VICINITY MAP

BATAVIA KILL WATERSHED PROJECT DAM No. 1

ABUTMENT AND FOUNDATION EXCAVATION DETAILS

ABUTMENT EXCAVATION: SLOPE ABUTMENT [illegible] SLOPE EXCAVATION LIMITS [illegible] OUTSIDE THE UPSTREAM TOE [illegible] OUTSIDE THE DOWNSTREAM TOE OF THE DAM

FOUNDATION EXCAVATION: EXCAVATE THE [illegible] DEPOSIT MATERIAL REPRESENTED BY TP 4 FROM 0.5 TO [illegible] AND DH-53 FROM [illegible] FROM THE BASE [illegible]

LEGEND
SEE SHEET 2

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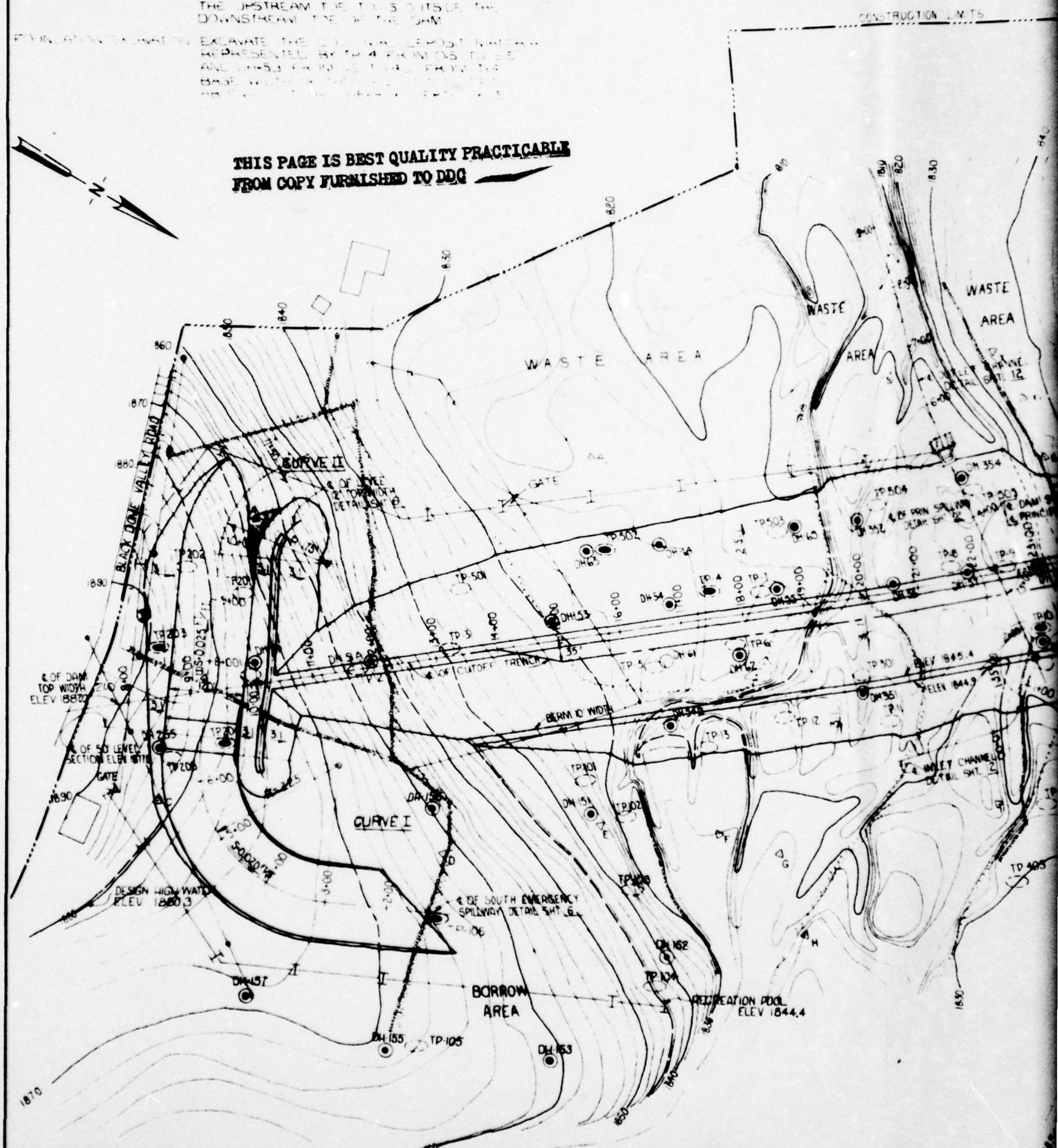

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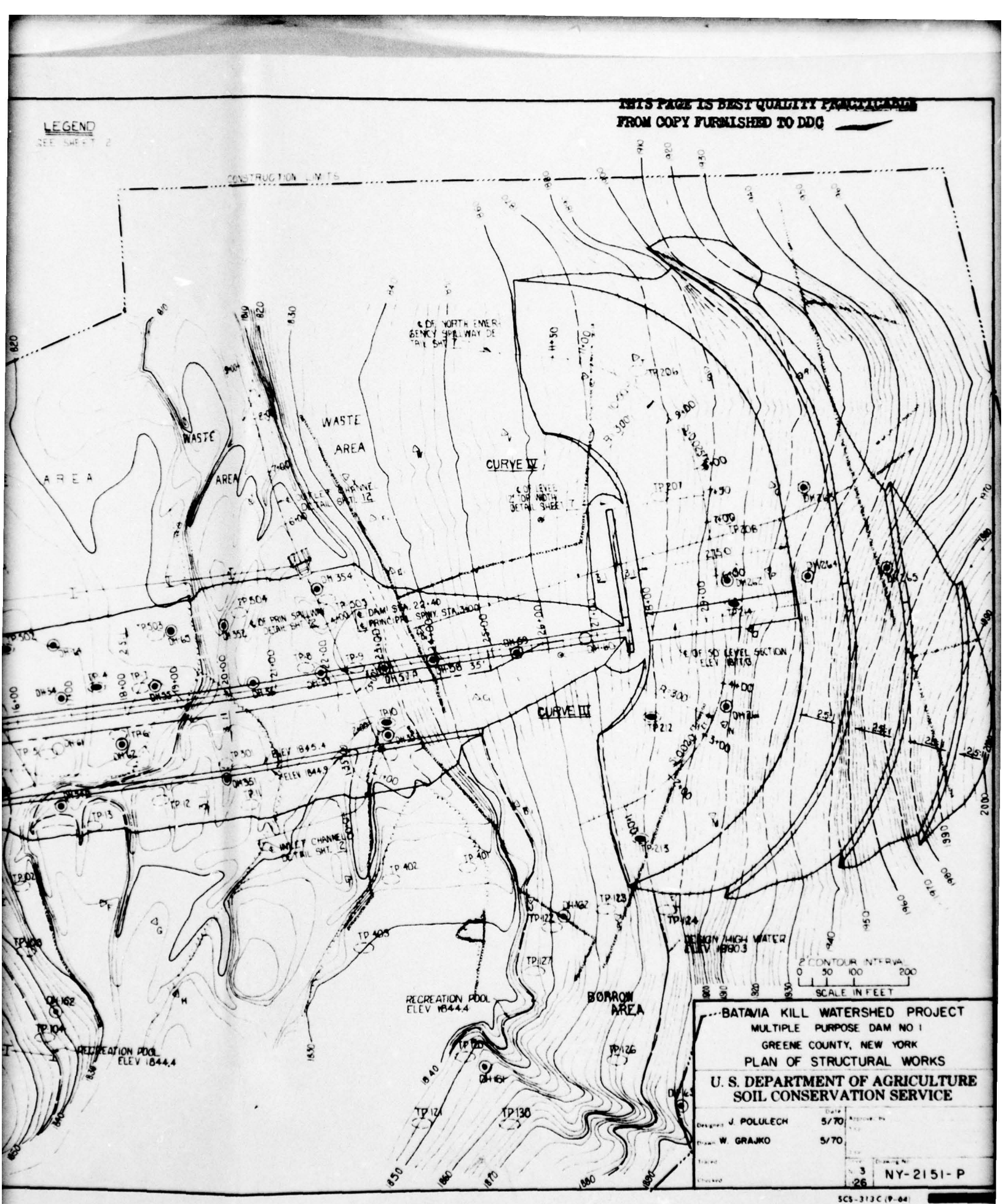

BATAVIA KILL WATERSHED PROJECT
MULTIPLE PURPOSE DAM NO 1
GREENE COUNTY, NEW YORK
PLAN OF STRUCTURAL WORKS

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Designed	J. POLULECH	Date	5/70
Drawn	W. GRAJKO	Date	5/70
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Checked		Sheet No.	3
		Drawing No.	26 NY-2151-P

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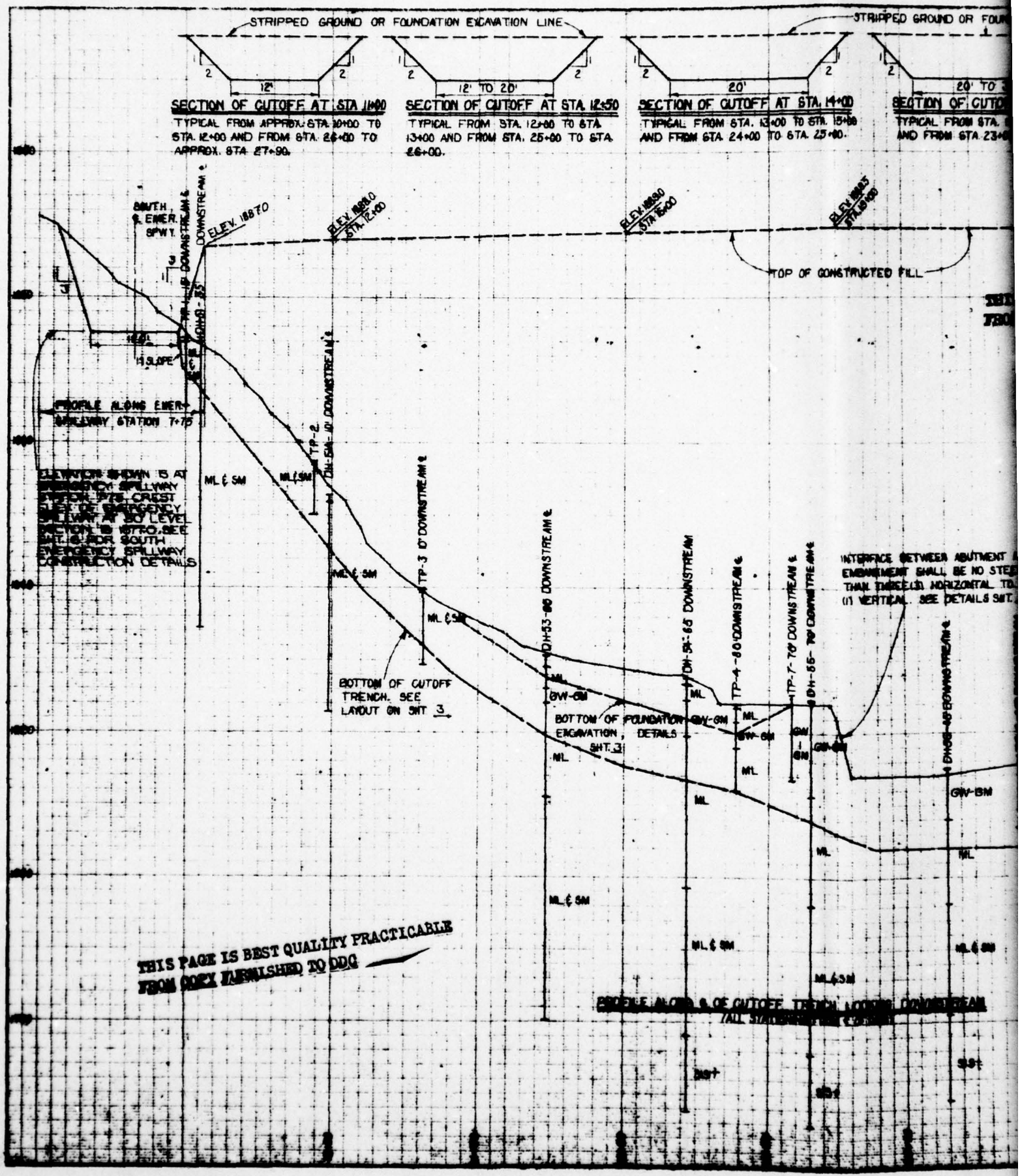

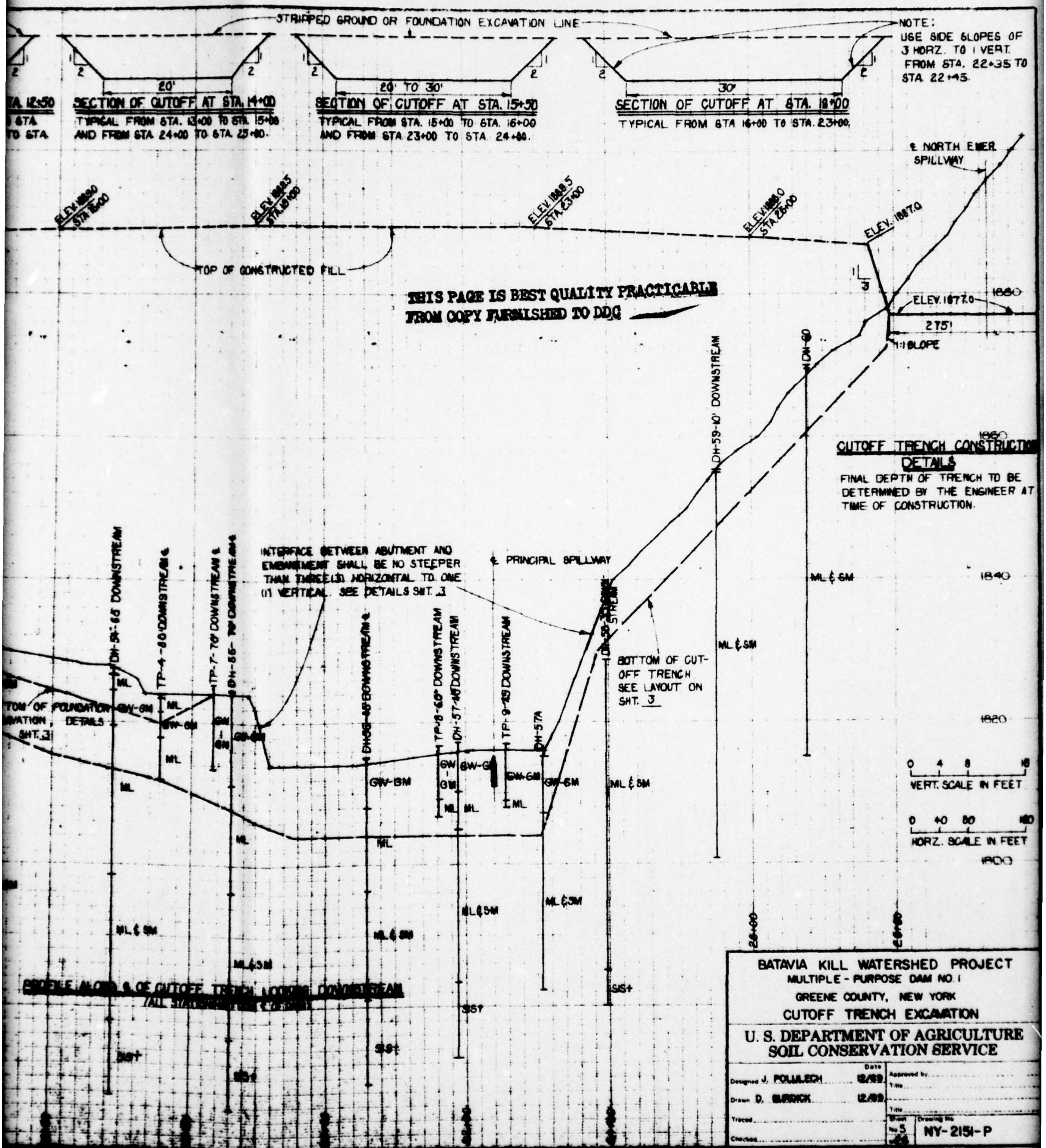
STRIPPED GROUND OR FOUNDATION EXCAVATION LINE
NOTE:
USE SIDE SLOPES OF 3 HORZ. TO 1 VERT. FROM STA. 22+35 TO STA. 22+45.
SECTION OF CUTOFF AT STA. 14+00
TYPICAL FROM STA. 13+00 TO STA. 15+00 AND FROM STA. 24+00 TO STA. 25+00.
SECTION OF CUTOFF AT STA. 15+50
TYPICAL FROM STA. 15+00 TO STA. 16+00 AND FROM STA. 23+00 TO STA. 24+00.
SECTION OF CUTOFF AT STA. 18+00
TYPICAL FROM STA 16+00 TO STA. 23+00.
20'
20' TO 30'
30'
℄ NORTH EMER. SPILLWAY
ELEV. 1887.0
ELEV. 1888.5 STA. 23+00
TOP OF CONSTRUCTED FILL
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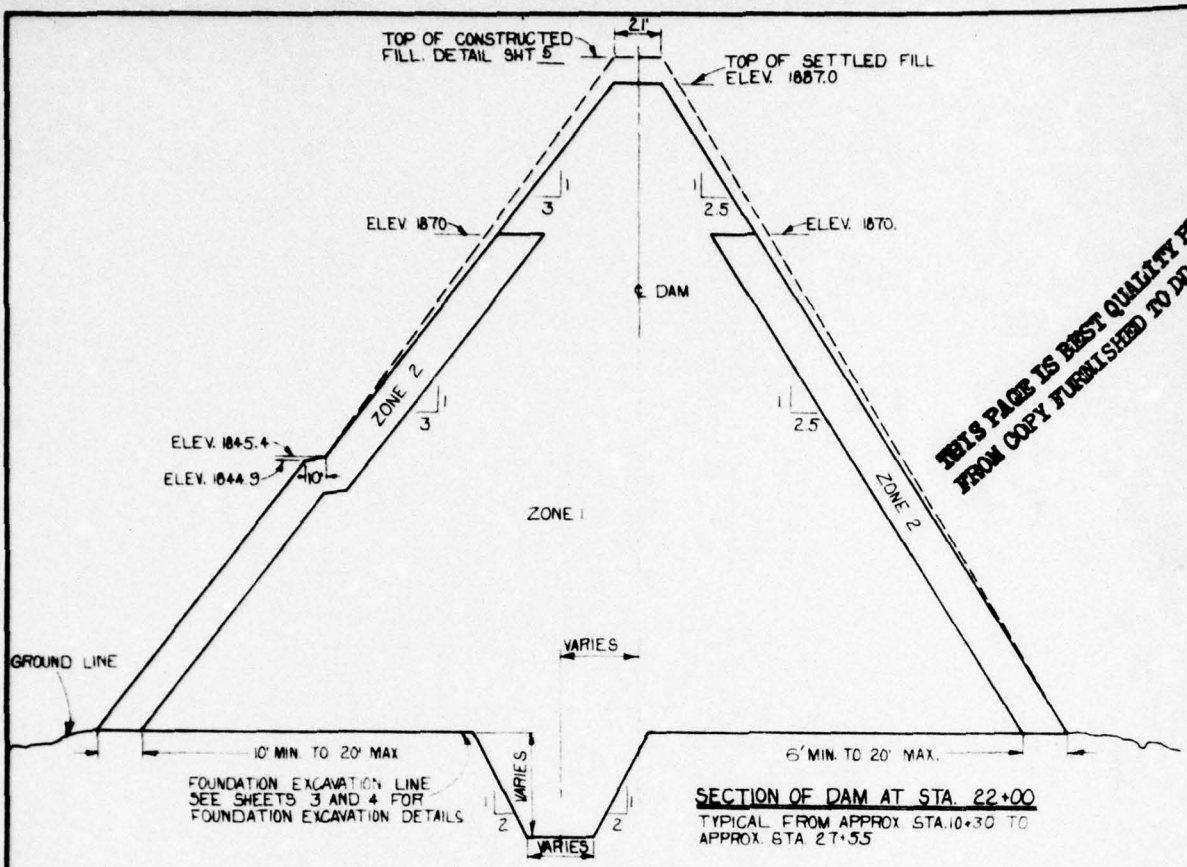
ELEV. 1877.0
275'
1:1 SLOPE
1880
1860
1840
1820
1800
CUTOFF TRENCH CONSTRUCTION DETAILS
FINAL DEPTH OF TRENCH TO BE DETERMINED BY THE ENGINEER AT TIME OF CONSTRUCTION.
DH-59-10' DOWNSTREAM
DH-60
INTERFACE BETWEEN ABUTMENT AND EMBANKMENT SHALL BE NO STEEPER THAN THREE (3) HORIZONTAL TO ONE (1) VERTICAL. SEE DETAILS SHT. 3
℄ PRINCIPAL SPILLWAY
BOTTOM OF CUT-OFF TRENCH SEE LAYOUT ON SHT. 3
TP-4-80' DOWNSTREAM ℄
TP-7-70' DOWNSTREAM ℄
TP-8-60' DOWNSTREAM
TP-9 DOWNSTREAM
DH-57A
DH-57 DOWNSTREAM
GW-GM
GW-SM
ML
ML & SM
SIS+
0 4 8 16
VERT. SCALE IN FEET
0 40 80 160
HORZ. SCALE IN FEET
BATAVIA KILL WATERSHED PROJECT
MULTIPLE - PURPOSE DAM NO. 1
GREENE COUNTY, NEW YORK
CUTOFF TRENCH EXCAVATION
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
Designed J. POLULECH 12/69
Drawn D. BURDICK 12/69
Traced
Checked
Approved by
Title
Sheet No. 5
Drawing No. NY-2151-P



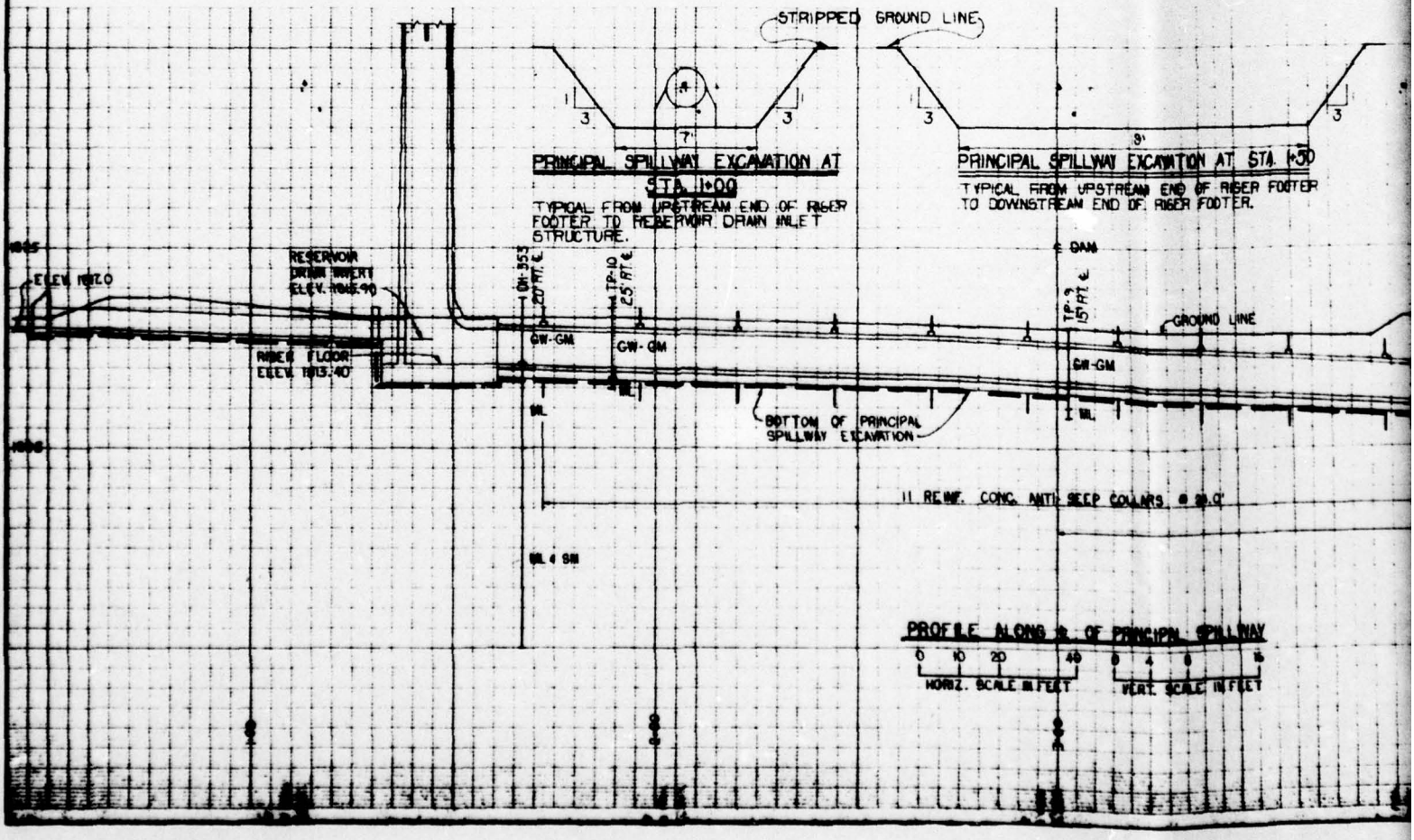
SECTION OF DAM AT STA. 22+00

TYPICAL FROM APPROX. STA. 10+30 TO APPROX. STA. 27+55

ZONE	MATERIAL 1/	ROCK SIZE
1	MATERIALS REPRESENTED BY: TP 214 FROM 0.5' TO 10.5' TP 106 FROM 0.5' TO 8.0' TP 123 FROM 0.5' TO 9.0' TP 203 FROM 0.5' TO 11.0'	6" MAXIMUM
2	OVERSIZE MATERIAL REMOVED FROM ZONE 1 AND THE EMERGENCY SPILLWAYS.	24" MAXIMUM WITH A MAXIMUM 10% LESS THAN 6"

1/ THE PLACEMENT TABLE INDICATES
2/ MAXIMUM ROCK SIZE PLACED IN
SHALL BE 3".
3/ MAXIMUM LIFT THICKNESS PRIOR
4/ WATER CONTENT AT TIME OF COMP
5/ FOR TYPICAL COMPACTION CURVES

1. ZONE BOUNDARIES INDICATED AR
TO UTILIZE ALL USEABLE REQUI
2. ZONE 2 SHALL BE CONSTRUCTED
1. TOPSOIL THAT IS SUITABLE FOR
INCORPORATED WITHIN THE SLOPE



TTLED FILL

EV. 1870.

ZONE 2

TO 20' MAX.

M AT STA. 22+00
PPROX. STA. 10+30 TO
35

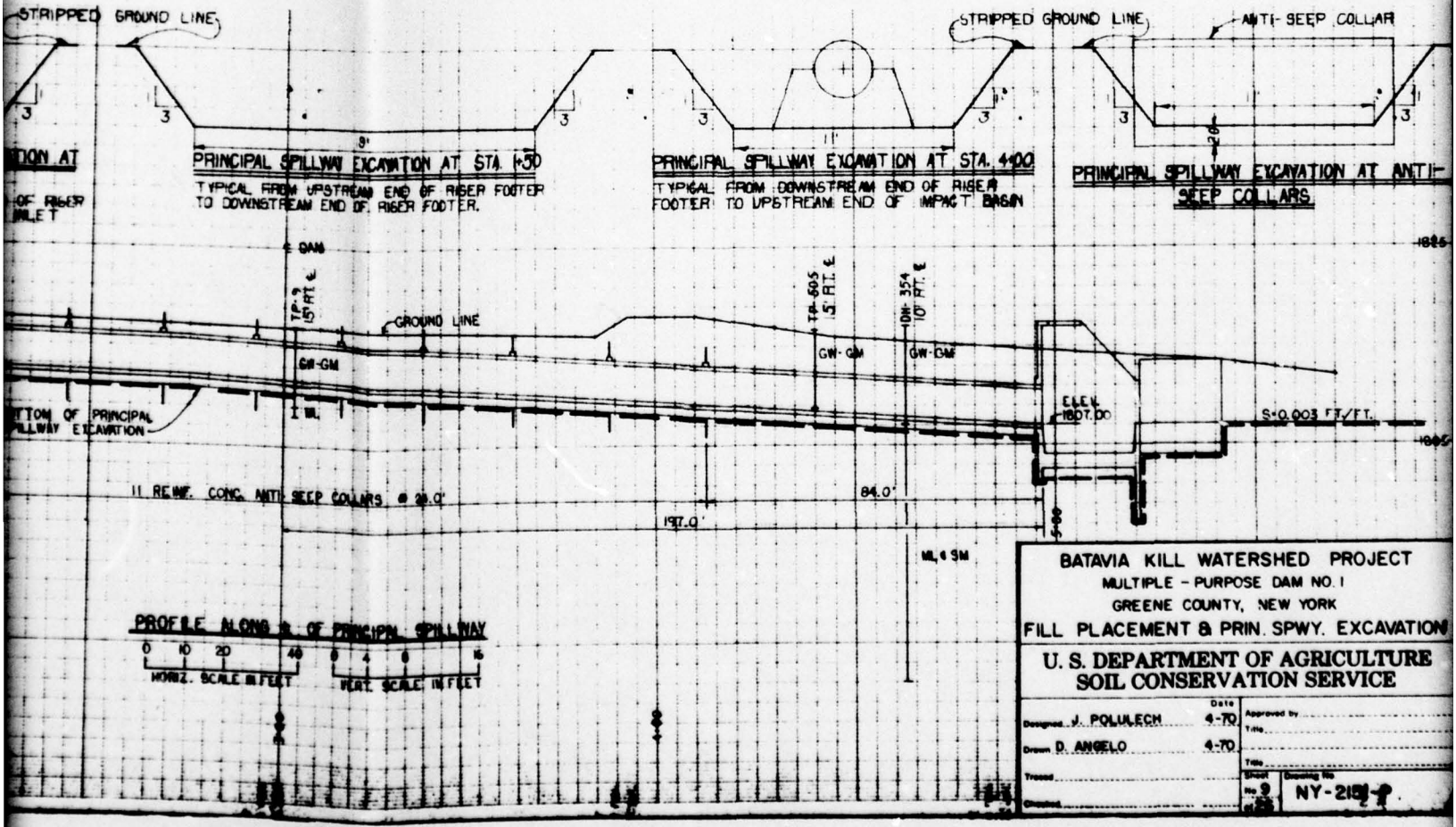
EARTH FILL REQUIREMENTS

ZONE	MATERIAL 1/	ROCK SIZE 2/	MAX. LIFT THICKNESS 3/	MIN. REQUIRED WATER CONTENT 4/	COMPACTION 5/ CLASS	COMPACTION 5/ DEFINITION
1	MATERIALS REPRESENTED BY: TP 214 FROM 0.5' TO 10.5' TP 106 FROM 0.5' TO 8.0' TP 123 FROM 0.5' TO 9.0' TP 203 FROM 0.5' TO 11.0'	6" MAXIMUM	9"	OPTIMUM	A	95% OF MAXIMUM DENSITY BY ASTM D-698 METHOD A.
2	OVERSIZE MATERIAL REMOVED FROM ZONE 1 AND THE EMERGENCY SPILLWAYS.	24" MAXIMUM WITH A MAXIMUM OF 10% LESS THAN 6".	36"	WET	C	FOUR PASSES PER LAYER OF FILL BY A SMOOTH-WHEEL VIBRATING ROLLER AT LEAST 72" WIDE, WEIGHING AT LEAST ONE TON (STATIC SERVICE WEIGHT) PER FOOT OF WIDTH AND CAPABLE OF EXERTING A DYNAMIC IMPACT OF AT LEAST 20,000 POUNDS AT THE RATE OF AT LEAST 1,200 TIMES PER MINUTE.

1/ THE PLACEMENT TABLE INDICATES ESTIMATED USE OF MATERIAL.
2/ MAXIMUM ROCK SIZE PLACED IN BACKFILL COMPACTED BY MEANS OF HAND TAMPING OR MANUALLY DIRECTED POWER TAMPERS OR PLATE VIBRATORS SHALL BE 3".
3/ MAXIMUM LIFT THICKNESS PRIOR TO COMPACTION.
4/ WATER CONTENT AT TIME OF COMPACTION.
5/ FOR TYPICAL COMPACTION CURVES SEE SHEET 25

CONSTRUCTION DETAILS

1. ZONE BOUNDARIES INDICATED ARE APPROXIMATE. ADJUSTMENTS WILL BE MADE BY THE ENGINEER TO PERMIT THE CONTRACTOR TO UTILIZE ALL USEABLE REQUIRED EXCAVATION WITHIN THE NEAT LINES OF THE EMBANKMENT.
2. ZONE 2 SHALL BE CONSTRUCTED ACCORDING TO THE AVAILABILITY OF OVERSIZE MATERIAL:
3. TOPSOIL THAT IS SUITABLE FOR USE AND NOT USED ON THE SPECIFIED AREAS OF THE EMERGENCY SPILLWAYS, SHALL BE INCORPORATED WITHIN THE SLOPES OF THE EARTH FILL (ABOVE ZONE 2) AS DIRECTED BY THE ENGINEER.

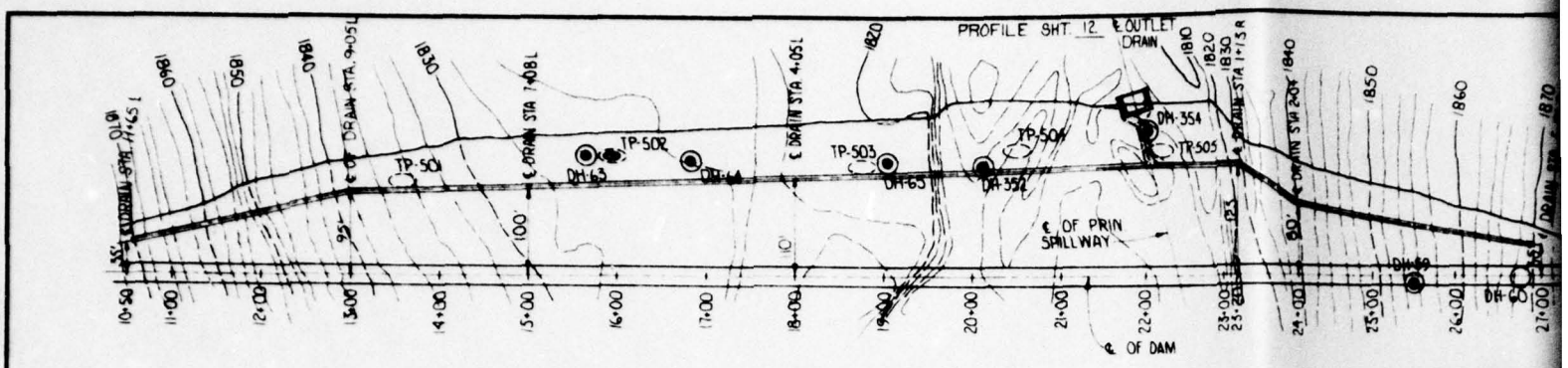


BATAVIA KILL WATERSHED PROJECT
MULTIPLE - PURPOSE DAM NO. 1
GREENE COUNTY, NEW YORK
FILL PLACEMENT & PRIN. SPWY. EXCAVATION

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

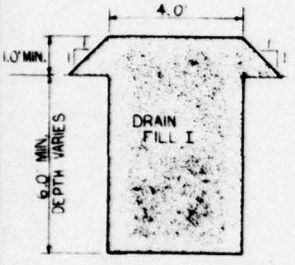
		Date
Designed	J. POLULECH	4-70
Drawn	D. ANGELO	4-70
Traced		
Checked		

Approved by
Title
Title
Sheet No. 9 of 25
Drawing No. NY-215-9

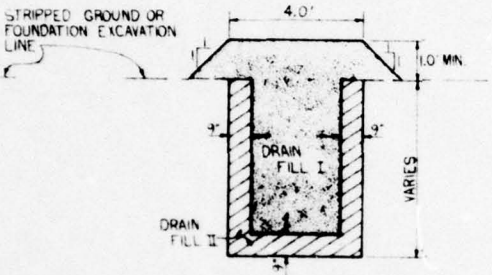


PLAN VIEW

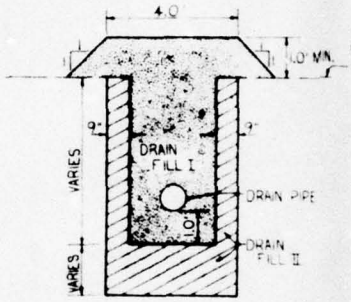
0 50 100 200 FT
SCALE



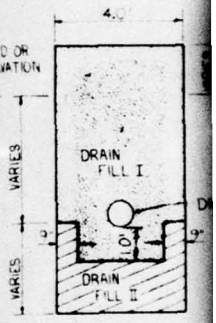
SECTION B-B ℄ G-G



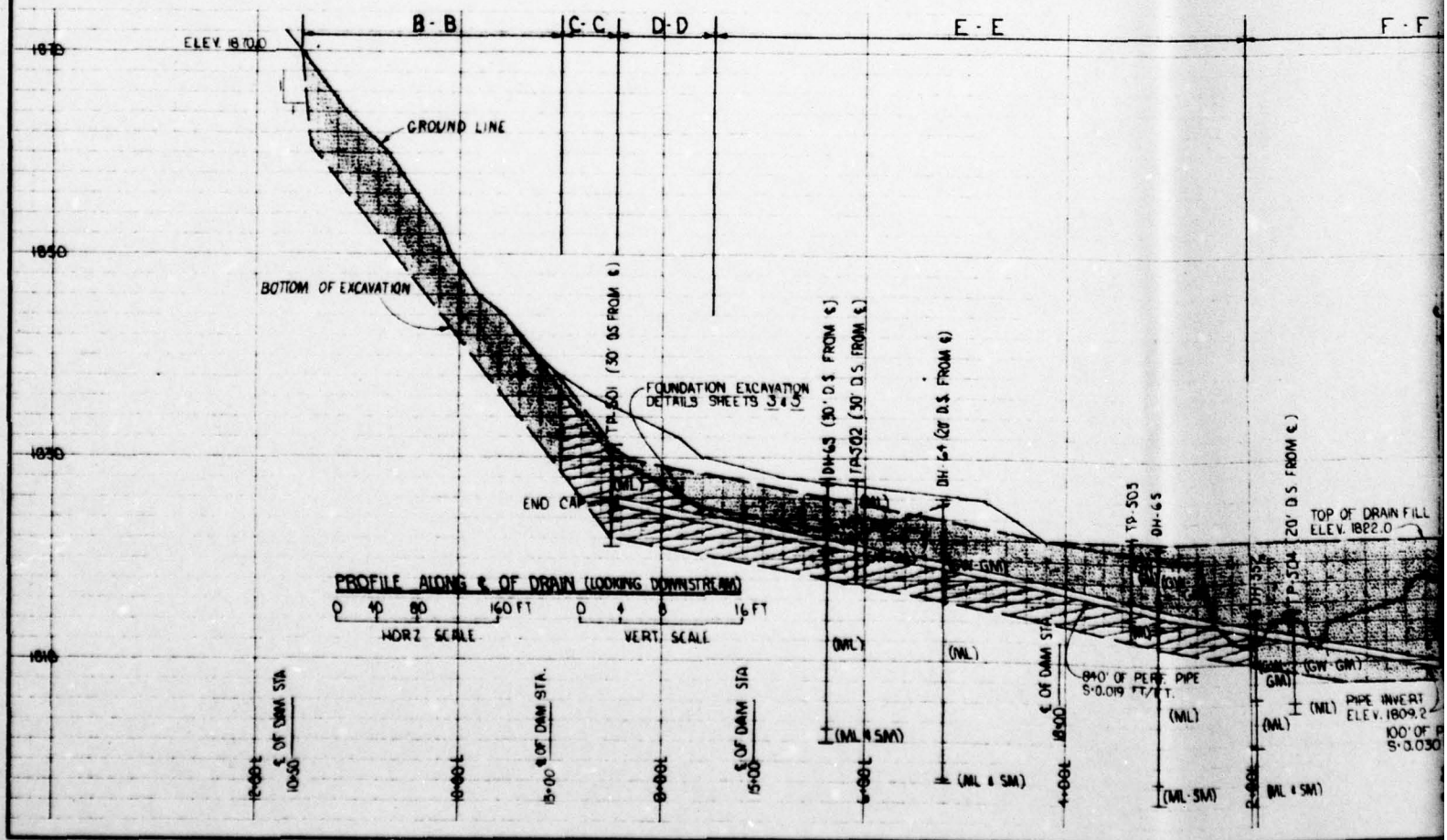
SECTION C-C

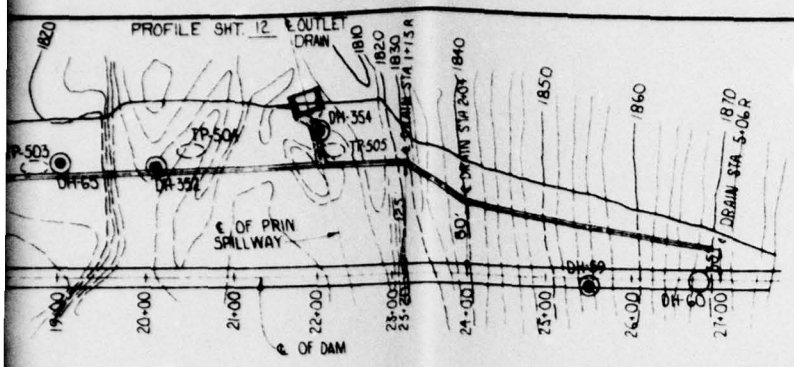


SECTION D-D



SECTION E-E





DRAINAGE SYSTEM DETAILS

1. PERF. DRAIN PIPE SHALL CONFORM TO SPECIFICATION 545 AND SHALL BE 10" DIA. PRESSURE PIPE, CLASS 200.
2. THE PROFILES AT THE BOTTOM OF ALL EXCAVATIONS AS SHOWN ARE ONLY APPROXIMATE. THE REQUIRED FINISHED GRADES WILL BE ESTABLISHED IN THE FIELD BY THE ENGINEER AT TIME OF CONSTRUCTION.

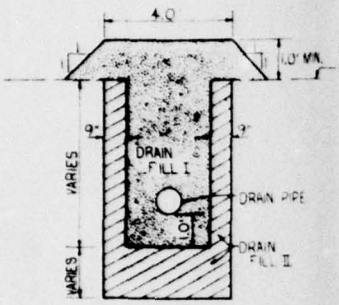
QUANTITY SUMMARY

CU. YDS. DRAIN FILL I
CU. YDS. DRAIN FILL II

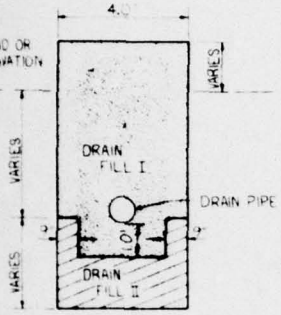
1124 LIN. FT. STRAIGHT SECTION OF PERFORATED ASBESTOS- CEMENT PIPE
2 END CAPS
2 11¼° BENDS (10" DIA.) (CAST IRON)
4 45° BENDS (10" DIA.) (CAST IRON)
2 90° BENDS (10" DIA.) (CAST IRON)

PLAN VIEW

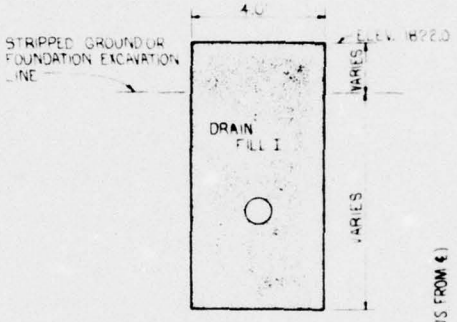
0 50 100 200 FT.
SCALE



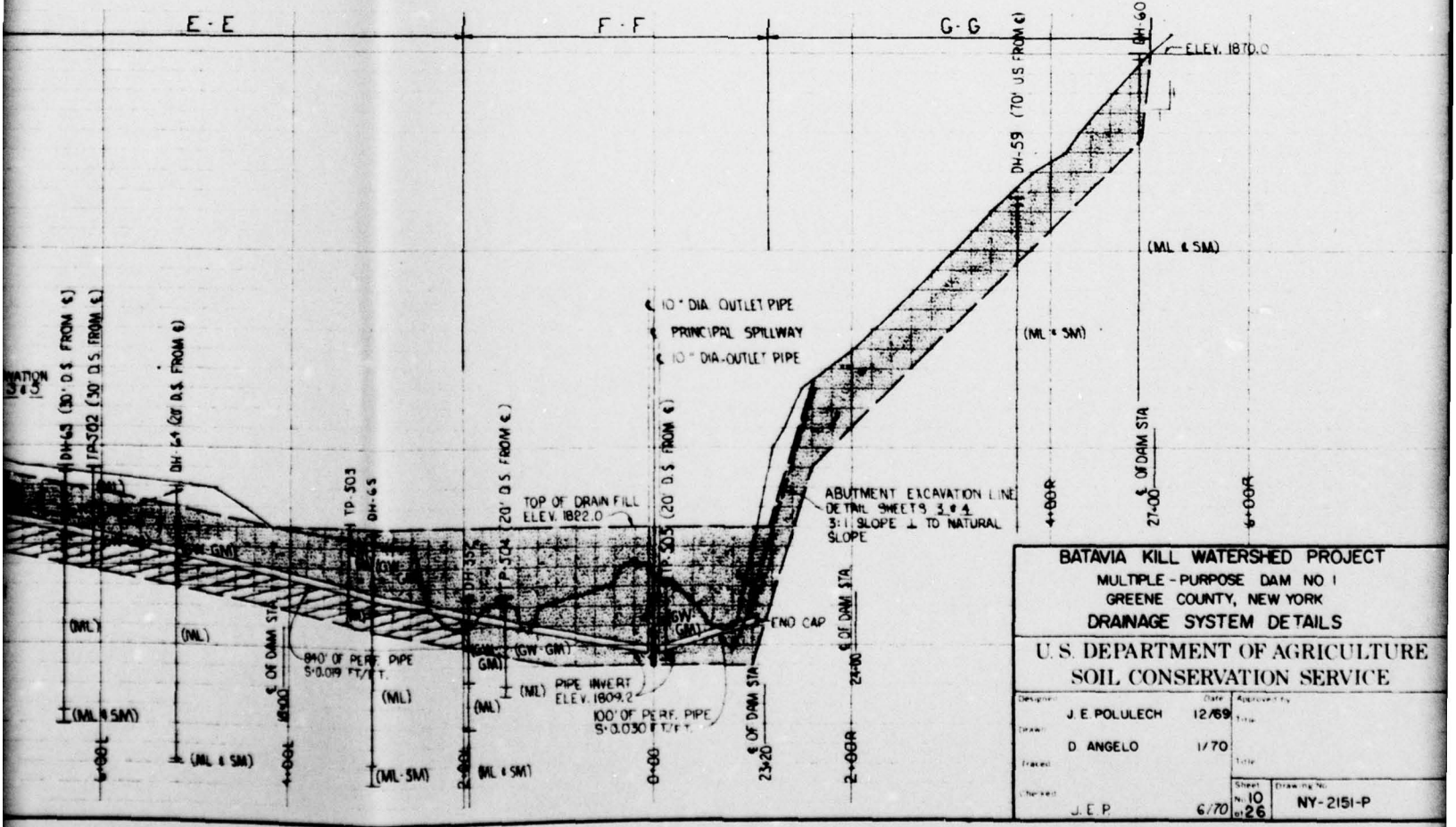
SECTION D-D



SECTION E-E



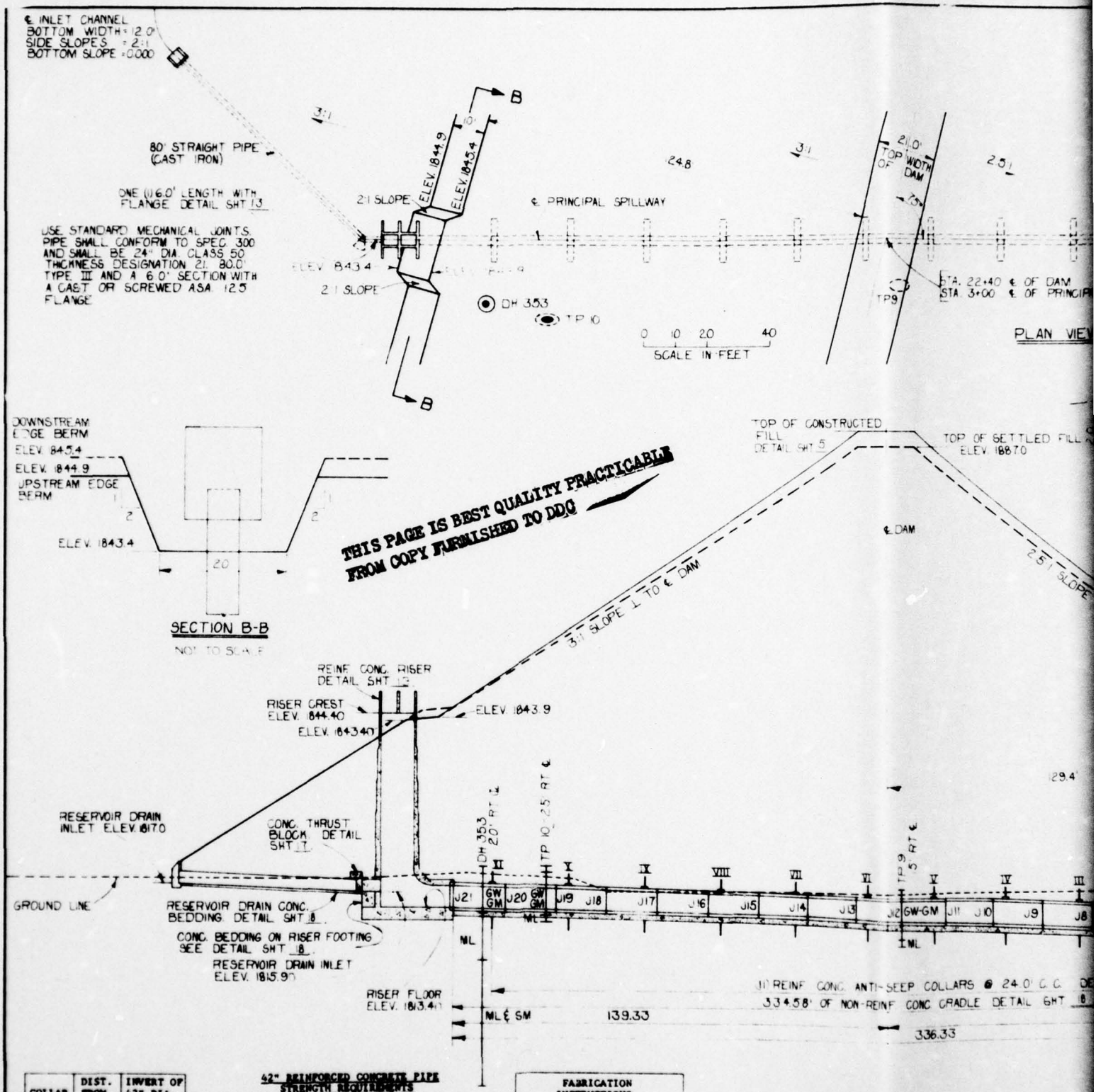
SECTION F-F



BATAVIA KILL WATERSHED PROJECT
MULTIPLE-PURPOSE DAM NO 1
GREENE COUNTY, NEW YORK
DRAINAGE SYSTEM DETAILS

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Designed	J. E. POLULECH	Date 12/69	Approved by
Drawn	D. ANGELO	1/70	Title
Traced			Title
Checked	J. E. P	6/70	Sheet No. 10 of 26 — Drawing No. NY-2151-P



COLLAR	DIST. FROM OUTLET	INVERT OF 42" DIA. CONDUIT
I	84	1809.10
II	108	1809.70
III	132	1810.30
IV	156	1810.90
V	180	1811.40
VI	204	1811.88
VII	228	1812.32
VIII	252	1812.56
IX	276	1812.80
X	300	1813.04
XI	324	1813.28

42" REINFORCED CONCRETE PIPE STRENGTH REQUIREMENTS

1. PRESSURE HEAD 72 FT.
2. LOAD 79,673 LBS. PER LIN FT. BASED ON O.D. OF 4.40 FT.
3. MIN 3 EDGE BEARING STRENGTH FOR 0.001" CRACK 19,152 LBS. PER LIN. FT. FOR PRESTRESSED PIPE (AWWA - C-301)

WHERE THE PIPE FURNISHED HAS AN OUTSIDE DIAMETER GREATER THAN THAT CALLED FOR ON THE PLANS THE THREE EDGE BEARING STRENGTH OF THE PIPE FURNISHED MUST BE EQUAL TO OR GREATER THAN THE SPECIFIED THREE-EDGE BEARING STRENGTH MULTIPLIED BY THE RATIO OF THE OUTSIDE DIAMETER OF THE PIPE FURNISHED TO THE OUTSIDE DIAMETER SPECIFIED.

FABRICATION INSTRUCTIONS

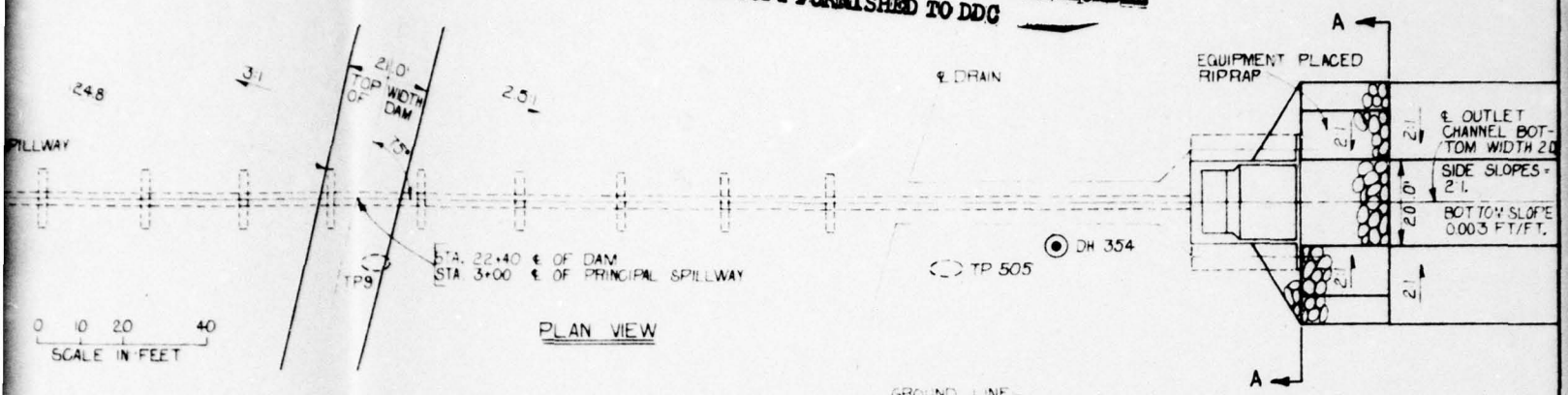
(21) 16.0' SECTIONS

ONE (1) SPIGOT RING WALL FITTING FOR 12" WALL

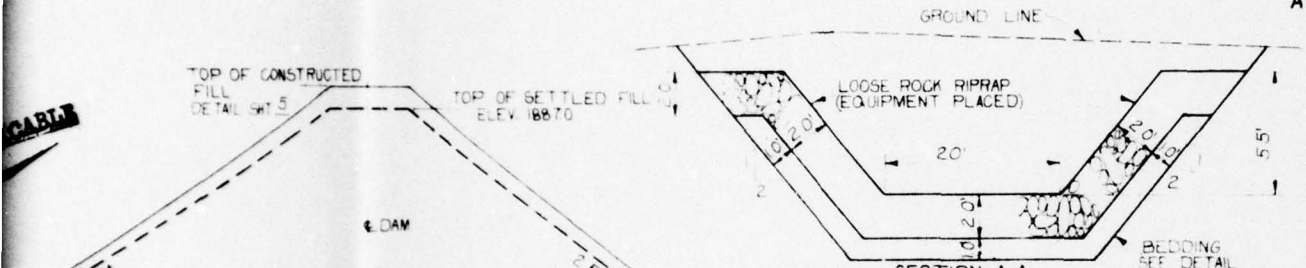
PIPE SUPPLIERS NOTE:

CAST OUTSIDE OF SPIGOT RING WITH CONCRETE ON ONE 16.0' SECTION

WHEN PIPE IS SUPPLIED IN LENGTHS OTHER THAN SHOWN, THE ENGINEER WILL PROVIDE THE CONTRACTOR WITH A REVISION OF THIS SHEET.



PLAN VIEW



SECTION A-A

RIPRAP DETAILS

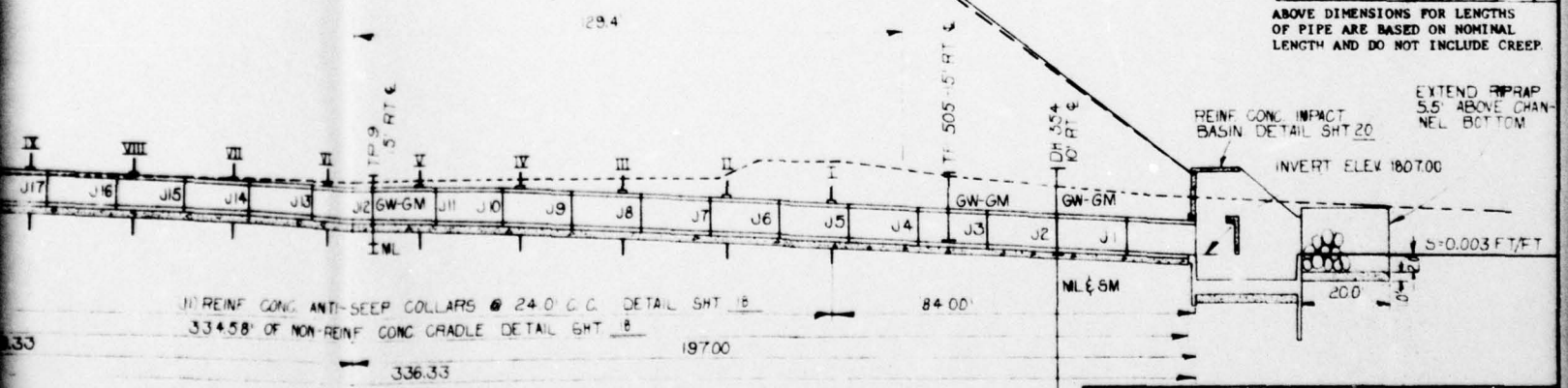
LOOSE ROCK RIPRAP SHALL BE GRADED FROM A MAXIMUM SIZE OF 24" TO A MINIMUM SIZE OF 3". A MAXIMUM OF 20% SHALL BE LESS THAN 6" (≈10 LB) AND A MAXIMUM OF 60% SHALL BE LESS THAN 12" (≈80 LB).

BEDDING SHALL MEET THE GRADATION REQUIREMENTS FOR DRAIN FILL I AS SHOWN ON SHT 11.

℄ DRAIN DETAIL SHTS 10 & 11

JOINT	DIST. FROM OUTLET	INVERT 42" DIA. PIPE	SLOPE
OUTLET	0	1807.00	
J-1	16	1807.40	
J-2	32	1807.80	
J-3	48	1808.20	
J-4	64	1808.60	
J-5	80	1809.20	
J-6	96	1809.40	
J-7	112	1809.80	
J-8	128	1810.20	
J-9	144	1810.60	
J-10	160	1811.00	0.0250 FT/FT
J-11	176	1811.32	
J-12	192	1811.64	
J-13	208	1811.96	
J-14	224	1812.28	
J-15	240	1812.44	0.0100 FT/FT
J-16	256	1812.60	
J-17	272	1812.76	
J-18	288	1812.92	
J-19	304	1813.08	
J-20	320	1813.24	
J-21	336	1813.40	

ABOVE DIMENSIONS FOR LENGTHS OF PIPE ARE BASED ON NOMINAL LENGTH AND DO NOT INCLUDE CREEP.



PROFILE ALONG ℄ PRINCIPAL SPILLWAY

0 5 10 20
VERT. SCALE IN FEET

0 10 20 40
HORZ. SCALE IN FEET

BATAVIA KILL WATERSHED PROJECT
MULTIPLE - PURPOSE DAM NO. 1
GREENE COUNTY, NEW YORK

PLAN PROFILE OF PRINCIPAL SPILLWAY

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

J. POLULECH 4/70
D. BURDICK 4/70
J E P 5/70

12/28 NY-2151-P

MATERIAL DESCRIPTIONS

A

Gravel, round to subround - well to poorly graded, having approx. 14% cobbles, 51% gravels, 30% sands and 5% fines - brown - moist to wet - average density 75 blows/ft. increasing w/depth - rapid (k = 260 ft./day) to medium permeability - alluvial gravel located in the flood plain.
Sample: 502.2 @8' (GW-GM)

B

Sand, silty with cobbles and occasional boulders - approx. 20% gravels, 65% sands and fines ranging from 40 to 25% - red-brown - moist to wet - medium to very dense - blow counts ranging from 30 to 100+ - slowly permeable - glacial till of Wisconsin age, overlaying bedrock.
Samples: 128.1, 204.1, 213.1 (ML & SM)

C

Silt, sandy, occasional cobbles, approx. 4% gravels, 36% sands and 60% fines - red - moist - loose to med. dense - blow counts ranging from 24 to 65 blows/ft. - slowly permeable - colluvial deposit of local origin in upper flood plain terrace @elev. 1825'+.
Sample: 502.1 (ML)

D

Silt - nonplastic, varved, very fine, 98% fines - red-brown - moist - medium soft, blow counts ranging from 8 to 30 blows/ft. mainly 12-15 blows/ft. - medium to low resistance to dilation - vertically very slow, horizontally medium slow permeability - glacio-lacustrine deposit in flood plain overlaying glacial till (material B).
Sample: 4.1 (ML)

E

Siltstone - Catskill formation - red - very fine grained - dense - hard - sound - hematite cemented - horizontal layers - weathered from 3' to 5' near surface.
Sample: NX core, DH's 54,55,56,57,58. (alst)

F

Topsoil - loose - organic matter - some stones and boulders - red-brown - permeable.

BACKHOE PIT LOGS

TP #1, C/L Dam, Elev. 1874.4

0	0.5	Material F (Topsoil)	
0.5	9.5	" B	(ML & SM)

TP #2, C/L Dam, Elev. 1857.4

0	0.5	Material F	
0.5	7.5	" B	(ML & SM)

TP #3, C/L Dam, Elev. 1838.8

0	0.5	Material F	
0.5	10.5	" B	(ML & SM)

TP #4, C/L Dam, Elev. 1824.0

0	0.5	Material F	
0.5	2.5	" C	(ML)
2.5	6.0	" A	(GW-GM)
6.0	12.0	" D	(ML)

NOTE: Sample 4.1 at 9'

TP #5, C/L Dam, Elev. 1829.9

0	0.5	Material F	
0.5	2.5	" C	(ML)
2.5	6.0	" A	(GW-GM)
6.0	10.0	" D	(ML)

TP #6, C/L Dam, Elev. 1825.7

0	12.0	Material A	(GW-GM)

NOTE: Water level @9'

TP #7, C/L Dam, Elev. 1825.3

0	12.0	Material A	(GW-GM)

TP #8, C/L Dam, Elev. 1816.7

0	7.5	Material A	(GW-GM)
7.5	10.0	" D	(ML)

NOTE: Water level @4.3'

TP #9, C/L Dam, Elev. 1816.9

0	8.0	Material A	(GW-GM)
8.0	9.0	" D	(ML)

NOTE: Water level @surface

TP #10, Foundation of Dam, Elev. 1820.0

0	1.0	Material F	
1.0	8.0	" A	(GW-GM)
8.0	9.0	" D	(ML)

NOTE: Water level @3.0'
Sample 10.1 @7'

TP #11, Foundation of Dam, Elev. 1818.4

0	9.0	Material A	(GW-GM)

NOTE: Water level @.'

TP #12, Foundation of Dam, Elev. 1821.3

0	9.0	Material A	(GW-GM)

NOTE: Water level @surface

TP #13, Foundation of Dam, Elev. 1819.7

0	9.0	Material A	(GW-GM)
9.0	10.0	" D	(ML)

NOTE: Water level @surface

TP #101, Borrow Area, L. Bank, Elev. 1833.7

0	0.5	Material F	
0.5	4.5	" B	(ML & SM)
4.5	11.5	" D	(ML)

TP #102, Borrow Area, L. Bank, Elev. 1827.3

0	0.5	Material F	
0.5	8.0	" A	(GW-GM)
8.0	12.0	" B	(ML & SM)

TP #103, Borrow Area, L. Bank, Elev. 1839.0

0	0.5	Material F	
0.5	11.5	" B	(ML & SM)

TP #104, Borrow Area, L. Bank, Elev. 1843.2

0	1.0	Material F	
1.0	12.0	" B	(ML & SM)

TP #105, Borrow Area, L. Bank, Elev. 1864.7

0	0.5	Material F	
0.5	11.0	" B	(ML & SM)

TP #106, Borrow Area, L. Bank, Elev. 1863.4

0	0.5	Material F	
0.5	8.0	" B	(ML & SM)

NOTE: Sample 106.1 @1'-8'

TP #120, Borrow Area, R. Bank, Elev. 1851.3

0	10.5	Material B	(ML & SM)

TP #121, Borrow Area, R. Bank, Elev. 1852.7

0	10.0	Material B	(ML & SM)

TP #122, Borrow Area, R. Bank, Elev. 1851.4

0	0.5	Material F	
0.5	10.5	" B	(ML & SM)

TP #123, Borrow Area, R. Bank, Elev. 1861.5

0	0.5	Material F	
0.5	10.5	" B	(ML & SM)

NOTE: Sample 123.1 @8'

TP #124, Borrow Area, R. Bank, Elev. 1876.4

0	0.5	Material F	
0.5	10.5	" B	(ML & SM)

NOTE: Slight seepage into pit @8'

TP #125, Borrow Area, R. Bank, Elev. 1898.6

0	0.5	Material F	
0.5	9.0	" B	(ML & SM)

NOTE: Some small seepage into pit.

TP #126, Borrow Area, R. Bank, Elev. 1872.4

0	0.5	Material F	
0.5	10.5	" B	(ML & SM)

NOTE: Some seepage into pit @4'

TP #127, Borrow Area, R. Bank, Elev. 1849.5

0	1.0	Material F	
1.0	8.5	" B	(ML & SM)

TP #128, Borrow Area, R. Bank, Elev. 1891.4

0	0.5	Material F	
0.5	10.0	" B	(ML & SM)

NOTE: Sample 128.1 @6'

TP #129, Borrow Area, R. Bank, Elev. 1891.1

0	9.5	Material B	(ML & SM)

NOTE: Some small seepage into pit.

TP #130, Borrow Area, R. Bank, Elev. 1864.6

0	9.0	Material B	(ML & SM)

NOTE: Heavy boulders from 6'-9'.
Some seepage into pit @4'-6'.

TP #201, Emer. Spillwy., L. Bank, Elev. 1871.1

0	0.5	Material F	
0.5	11.0	" B	(ML & SM)

TP #202, Emer. Spill., L. Bank, Elev. 1881.7

0	0.5	Material F	
0.5	10.0	" B	(ML & SM)

TP #203, Emer. Spill., L. Bank, Elev. 1887.9

0	0.5	Material F	
0.5	11.0	" B	(ML & SM)

NOTE: Sample 203.1 @10'

TP #204, Emer. Spill., L. Bank, Elev. 1877.5

0	0.5	Material F	
0.5	10.0	" B	(ML & SM)

NOTE: Sample 204.1 @8'

TP #120, Borrow Area, R. Bank, Elev. 1851.3

0 10.5 Material B (ML & SM)

TP #121, Borrow Area, R. Bank, Elev. 1852.7

0 10.0 Material B (ML & SM)

TP #122, Borrow Area, R. Bank, Elev. 1851.4

0 0.5 Material F

0.5 10.5 " B (ML & SM)

TP #123, Borrow Area, R. Bank, Elev. 1861.5

0 0.5 Material F

0.5 10.5 " B (ML & SM)

NOTE: Sample 123.1 @8'

TP #124, Borrow Area, R. Bank, Elev. 1876.4

0 0.5 Material F

0.5 10.5 " B (ML & SM)

NOTE: Slight seepage into pit @8'

TP #125, Borrow Area, R. Bank, Elev. 1898.5

0 0.5 Material F

0.5 9.0 " B (ML & SM)

NOTE: Some small seepage into pit.

TP #126, Borrow Area, R. Bank, Elev. 1872.8

0 0.5 Material F

0.5 10.5 " B (ML & SM)

NOTE: Some seepage into pit @4'

TP #127, Borrow Area, R. Bank, Elev. 1849.5

0 1.0 Material F

1.0 8.5 " B (ML & SM)

TP #128, Borrow Area, R. Bank, Elev. 1891.4

0 0.5 Material F

0.5 10.0 " B (ML & SM)

NOTE: Sample 128.1 @6'

TP #129, Borrow Area, R. Bank, Elev. 1891.1

0 9.5 Material B (ML & SM)

NOTE: Some small seepage into pit.

TP #130, Borrow Area, R. Bank, Elev. 1864.6

0 9.0 Material B (ML & SM)

NOTE: Heavy boulders from 6'-9'.
Some seepage into pit @4'-6'.

TP #201, Emer. Spillwy., L. Bank, Elev. 1871.1

0 0.5 Material F

0.5 11.0 " B (ML & SM)

TP #202, Emer. Spill., L. Bank, Elev. 1881.7

0 0.5 Material F

0.5 10.0 " B (ML & SM)

TP #203, Emer. Spill., L. Bank, Elev. 1887.9

0 0.5 Material F

0.5 11.0 " B (ML & SM)

NOTE: Sample 203.1 @10'

TP #204, Emer. Spill., L. Bank, Elev. 1877.5

0 0.5 Material F

0.5 10.0 " B (ML & SM)

NOTE: Sample 204.1 @8'

TP #205, Emer. Spill., L. Bank, Elev. 1883.5

0 0.5 Material F

0.5 11.0 " B (ML & SM)

NOTE: Some seepage into pit.

TP #206, Emer. Spill., R. Bank, Elev. 1877.1

0 0.5 Material F

0.5 9.0 " B (ML & SM)

NOTE: Heavy inflow from adjacent stream.

TP #207, Emer. Spill., R. Bank, Elev. 1880.8

0 0.5 Material F

0.5 9.5 " B (ML & SM)

NOTE: Some small seepage into pit.

TP #208, Emer. Spill., R. Bank, Elev. 1898.3

0 0.5 Material F

0.5 10.5 " B (ML & SM)

NOTE: Some small seepage into pit.

TP #212, Emer. Spill., R. Bank, Elev. 1873.2

0 0.5 Material F

0.5 9.0 " B (ML & SM)

NOTE: Sample 212.1 @4'-5'

TP #213, Emer. Spill., R. Bank, Elev. 1876.1

0 0.5 Material F

0.5 11.0 " B (ML & SM)

NOTE: Sample 213.1 @1'-11'

TP #214, Emer. Spill., R. Bank, Elev. 1903.0

0 0.5 Material F

0.5 10.5 " B (ML & SM)

NOTE: Sample 214.1 @4'-5'

TP #301, Prin. Spill., Elev. 1816.3

0 8.0 Material A (GW-GM)

NOTE: Heavy inflow from creek.

TP #401, Flood Plain, Upstream, Elev. 1828.0

0 0.5 Material F

0.5 7.5 " A (GW-GM)

7.5 9.0 " D (ML)

NOTE: Water level @4.5'

TP #402, Flood Plain, Upstream, Elev. 1828.0

0 9.0 Material C (ML)

9.0 10.0 " A (GW-GM)

NOTE: Water level @3.5'

TP #403, Flood Plain, Upstream, Elev. 1831.5

0 3.0 Material C (ML)

3.0 8.0 " A (GW-GM)

NOTE: Water level @5.0'

TP #501, Drain Line, Elev. 1831.2

0 0.5 Material F

0.5 10.0 " C (ML)

NOTE: Some small seepage @1'-2'

TP #502, Drain Line, Elev. 1827.9

0 0.5 Material F

0.5 4.0 " C (ML)

4.0 10.0 " A (GW-GM)

NOTE: Water level @8'
Samples 502.1 @3', 502.2 @8'

TP #503, Drain Line, Elev. 1822.5

0 8.0 Material A (GW-GM)

8.0 10.0 " D (ML)

TP #504, Drain Line, Elev. 1815.0

0 9.0 Material A (GW-GM)

9.0 10.0 D (ML)

NOTE: Heavy inflow from creek, cave-in of walls.

TP #505, Drain Line, Elev. 1816.6

0 0.3 Material F

0.3 8.0 " A (GW-GM)

NOTE: Water level @3'
Abandoned pit due to heavy boulders.

DRILL HOLE LOGS

DH #51, C/L Dam, Elev. 1874.4

0.0
RB Material F
0.5
RB
39
RB
40
RB
88 Material B (ML & SM)
RB
47
RB
66
RB
68
RB
55
RB
56
40.0

DH #51A, C/L Dam, Elev. 1852.8

0.0
RB Material F
1.0
RB
78
RB
46 Material B (ML & SM)
RB
RB
52
RB
48
RB
102
RB
132
30.0

NOTE: Boulders @20'-25'

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BATAVIA KILL WATERSHED
SITE 1
FLOODWATER RETARDING DAM
GREENE COUNTY, NEW YORK
LOGS OF TEST HOLES
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Approved 6-68 STATE CONS ENGINEER

AHC 23/26 NY-2151

SCS-313C (9-64)

DRILL HOLE LOGS (continued)

DH #53, C/L Dam, Elev. 1830.6

	0.0	
16		Material F
	1.5	
42		Material C (ML)
65		
	4.5	
79		Material A (GW-GM)
	6.5	
70		
32		
33		
32		Material D (ML)
33		
32		
36		
41		
	19.5	
104		
54		
RB		
105		Material B (ML & SM)
RB		
140		
RB		
100		
RB		
100		
	50.8	

NOTE: Boulders @35'-45'
Water level @1.5' (6/7/68)

DH #54, C/L Dam, Elev. 1827.5

	0.0	
		Material F
	0.8	
24		Material C (ML)
	3.0	
RB		Material A (GW-GM)
	8.0	
24		
10		
8		
12		Material D (ML)
14		
12		
15		
13		
13		
17		
18		
	29.0	
100/0.2		
117/0.5		
106		
90		
106/0.4		Material B (ML & SM)
120		
128		
117		
120		
96		
160		
168		
94		
100/0.5		
	49.5	
NX		Material E (slst)
100%		
	60.0	

NOTE: Boulders @26.5'; 30.5'; 35.9'; 38.5'; 47.5'; 49.0'.
Water level @5.9' (6/7/68)

DH #54A, Foundation of Dam, Elev. 1819.0

	0.0	
RB		Material A (GW-GM)
28		
RB		
	8.5	
17		
RB		Material D (ML)
23		
RB		
	17.0	
33		
RB		Material B (ML & SM)
39		
	26.5	

DH #55, C/L Dam, Elev. 1824.6

	0.0	
		Material F
	0.4	
26		
22		Material A (GW-GM)
RB		
16		
20		
14		
	13.4	
10		
11		
11		
9		Material D (ML)
11		
12		
9		
15		
14		
15		
	28.5	
21		
65		
60		Material B (ML & SM)
55		
68		
112		
119		
120		
50/0.4		
111		
95		
122		
50/0.4		
	49.0	
NX		
100%		Material E (slst)
	59.0	

NOTE: Boulders at 39.3'; 40.9'; 42.0'; 47.9'. Shelby sample @20'-22'.

DH #56, C/L Dam, Elev. 1815.8

	0.0	
RB		Material A (GW-GM)
	7.0	
10		
12		
12		Material D (ML)
17		
18		
19		
32		
26		
	18.7	
32		
45		
80		Material B (ML & SM)
35/0.2		
83		
35/0.2		
119		
70/0.3		
100		
	34.0	
NX		
85%		Material E (slst)
NX		
98%		
	46.0	

NOTE:
1. Boulders @ 23.7, 27.2, 30.3, 32.6
2. Percolation test at 2' in material A.
3. Shelby sample @10'-12'.
4. Water level @1.5' (6/7/68).

DH #57, C/L Dam, Elev. 1817.2

	0.0	
RB		Material A (GW-GM)
75		
	7.0	
RB		
19		Material D (ML)
20		
	12.3	
28		
100/0.4		
150		
150		Material B (ML & SM)
61		
131		
150		
100/0.4		
60		
82		
160		
75		
98		
79		
70/0.3		
	33.8	
NX		
100%		Material E (slst)
	44.5	

NOTE: Boulders @ 13.5 to 18.0'; 22.5'.
Water level @3.9' (6/7/68).

DH #57A, C/L Dam, Elev. 1815.2

	0.0	
RB		Material A (GW-GM)
	8.0	
RB		
35/0.4		
73		
83		Material B (ML & SM)
RB		
50/0.2		
RB		
60/0.4		
RB		
35/0.2		
RB		
	33.0	

NOTE: Boulders @10.4'; 19.7'; 25.4'; 30.2'.

DH #58, C/L Dam, Elev. 1828.7

	0.0	
RB		
91		
150		
82		
64		Material B (ML & SM)
RB		
80		
RB		
86		
RB		
81		
RB		
72		
RB		
167/0.9		
	43.7	
NX		Material E (slst)
100%		
	48.7	

NOTE: Varved silt lense from 37'-37.5'. Silt dense and hard.

DH #59, C/L Dam, Elev. 1855.4

	0.0	
RB		Sandstone boulders
	0.6	
RB		
82/.10		
RB		
54		
72		Material B (ML & SM)
73		
42		
80		
100/0.3		
RB		
118		
RB		
175/0.1		
RB		
	54.7	

NOTE: Boulders @6.5'; 15.2'; 25.4'; 35.5'.
Water level @1.1' (6/7/68).

DH #60, C/L Dam, Elev. 1870.0

	0.0	
RB		Material F
	0.5	
RB		Material B (ML & SM)
	55.0	

NOTE: Probing for bedrock.

DH #61, C/L Dam, Terrace Elev. 1825.0 in Flood Plain Elev. 1829.0

	0.0	
RB		Material F
	0.6	
RB		Material A (GW-GM)
	6.8	
RB		Material D (ML)
	28.5	
RB		Material B (ML & SM)
	35.0	

NX
100%

33.8

Material E (alst)

44.5

NOTE: Boulders @ 13.5 to 18.0'; 22.5'.
Water level @3.9' (6/7/68).

DH #57A, C/L Dam, Elev. 1815.2

RB
RB
35/0.4
73
83
RB
50/0.2
RB
60/0.4
RB
35/0.2
RB

0.0

Material A (GW-GM)

8.0

Material B (ML & SM)

33.0

NOTE: Boulders @10.4'; 19.7'; 25.4'; 30.2'.

DH #58, C/L Dam, Elev. 1848.7

RB
91
150
82
64
RB
80
RB
86
RB
81
RB
72
RB
167/0.9

0.0

Material B (ML & SM)

43.7

NX
100%

Material E (alst)

48.7

NOTE: Varved silt lense from 37'-37.5'. Silt dense and hard.

DH #59, C/L Dam, Elev. 1855.4

RB
RB
82/.10
RB
54
72
73
42
80
100/0.3
RB
118
RB
175/0.1
RB

0.0

Sandstone boulders

0.

Material B (ML & SM)

54.7

NOTE: Boulders @6.5'; 15.2'; 25.4'; 35.5'.
Water level @1.1' (6/7/68).

DH #60, C/L Dam, Elev. 1870.0

RB
RB

0.0

Material F

0.5

Material B (ML & SM)

55.0

NOTE: Probing for bedrock.

DH #61, C/L Dam, Terrace Elev. 1825.0 in Flood Plain Elev. 1826.0

RB
RB
RB
RB

0.0

Material F

0.6

Material A (GW-GM)

6.8

Material D (ML)

28.5

Material B (ML & SM)

35.0

DH #62, C/L Dam Terrace Elev. 1825.0 in Flood Plain Elev. 1826.0

RB
RB
13
RB
13
RB
14
RB
14
RB
RB
31

0.0

Material F

0.5

Material A (GW-GM)

10.0

Material D (ML)

28.0

Material B (ML & SM)

31.5

DH #63, C/L Dam Terrace Elev. 1825.0 in Flood Plain Elev. 1826.0

RB
RB
23
RB
18
RB
19
RB
42

0.0

Material F

0.7

Material A (GW-GM)

7.1

Material D (ML)

24.6

Material B (ML & SM)

26.1

DH #64, C/L Dam Terrace Elev. 1825.0 in Flood Plain Elev. 1826.0

RB
RB
15
RB
12
RB
11
RB
15
RB

0.0

Material F

0.6

Material A (GW-GM)

8.0

Material D (ML)

27.5

Material B (ML & SM)

28.0

DH #65, C/L Dam Terrace Elev. 1825.0 in Flood Plain Elev. 1826.0

RB
RB
12
RB
13
RB
16
RB
RB
41

0.0

Material F

0.5

Material A (GW-GM)

8.2

Material D (ML)

23.5

Material B (ML & SM)

25.5

DH #151, Borrow Area, L. Bank, Elev. 1837.0

RB
68
RB
84
RB
85
RB
166

0.0

Material F

0.5

Material B (ML & SM)

21.5

DH #152, Borrow Area, L. Bank, Elev. 1841.4

RB
120
RB
100
RB
72
RB
84

0.0

Material F

1.5

Material B (ML & SM)

21.5

DH #153, Borrow Area, L. Bank, Elev. 1859.7

RB
62
RB
86
RB
200
RB
120

0.0

Material F

0.5

Material B (ML & SM)

21.5

DH #155, Borrow Area, L. Bank, Elev. 1867.8

RB
RB
86
RB
93
RB
120
RB
175
RB
129
RB
84

0.0

Material F

1.0

Material B (ML & SM)

30.0

NOTE: Boulders @21.0'.

DH #156, Borrow Area, L. Bank, Elev. 1858.7

RB
RB
43
RB
54
RB
54
RB
73
RB
76
RB
66

0.0

Material F

0.5

Material B (ML & SM)

31.5

NOTE: Boulders @23'.

BATAVIA KILL WATERSHED
SITE I
FLOODWATER RETARDING DAM
GREENE COUNTY, NEW YORK
LOGS OF TEST HOLES

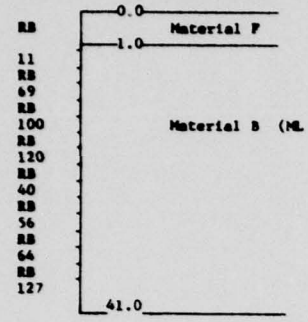
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Logged: Ray Aye Date: 6-68
Approved: STATE CONS ENGINEER
Drawn:
Title:
Checked: A.H.C.
Sheet No. 24 of 28
Drawing No. NY-215I

SCS-313C (9-64)

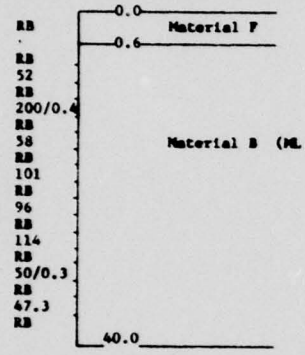
Drill Hole Logs (continued)

DH #157, Borrow Area, L. Bank, Elev. 1872.0

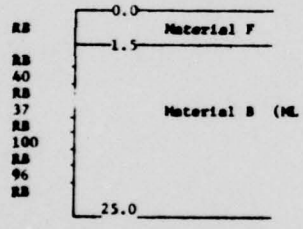


NOTE: Boulders @15.0'; 30'-35'; 40.0'.

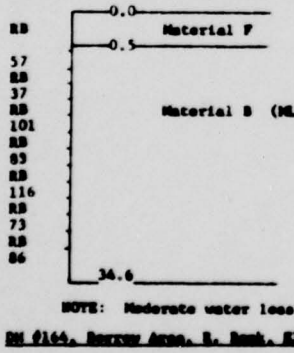
DH #161, Borrow Area, R. Bank, Elev. 1855.6



DH #162, Borrow Area, R. Bank, Elev. 1851.0

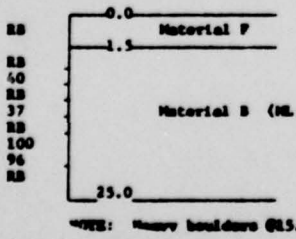


DH #163, Borrow Area, R. Bank, Elev. 1892.5



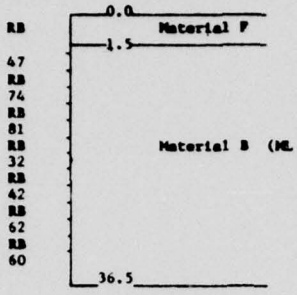
NOTE: Moderate water loss @26'.

DH #164, Borrow Area, R. Bank, Elev. 1886.1



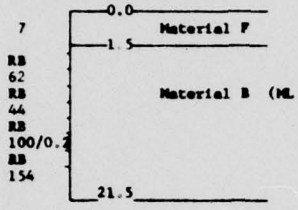
NOTE: Heavy boulders @15.0'.

DH #165, Borrow Area, R. Bank, Elev. 1891.8

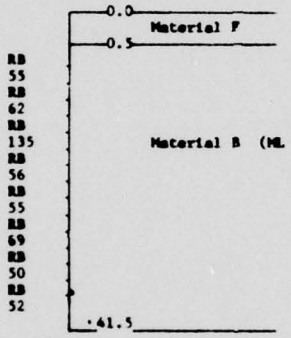


NOTE: Boulders @6'. Gravel lenses @25.0'; 31.0'; 36.0'.

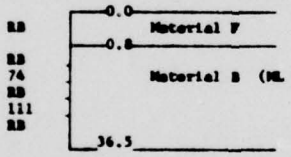
DH #166, Borrow Area, R. Bank, Elev. 1870.0



DH #255, Emer. Spill, L. Bank, Elev. 1881.7

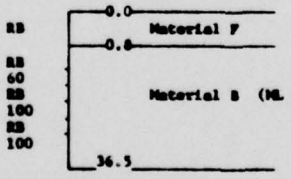


DH #261, Emer. Spill, R. Bank, Elev. 1898.0



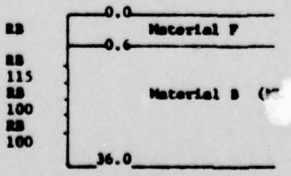
NOTE: Water level @2' (6/7/68)

DH #262, Emer. Spill, R. Bank, Elev. 1900.2



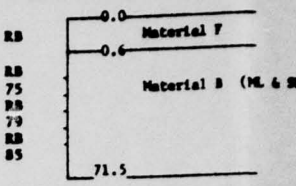
NOTE: Boulders @21.5'; 36.5'.

DH #263, Emer. Spill, R. Bank, Elev. 1914.0

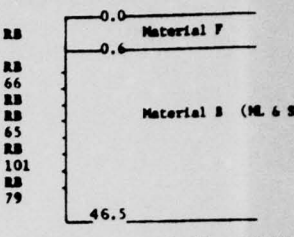


NOTE: Heavy boulders at surface and @20'; 36'.

DH #264, Emer. Spill, R. Bank, Elev. 1928.0

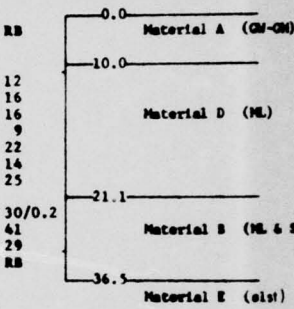


DH #265, Emer. Spill, R. Bank, Elev. 1954.0

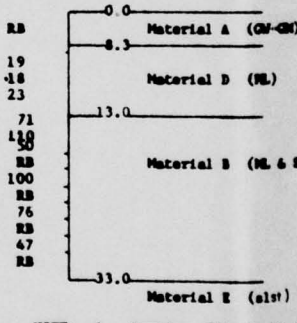


NOTE: Heavy boulders @20-23'.

DH #351, Prin. Spill, Elev. 1816.3

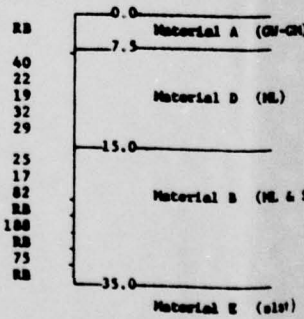


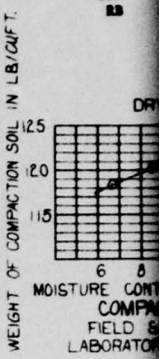
DH #352, Prin. Spill, Elev. 1816.8

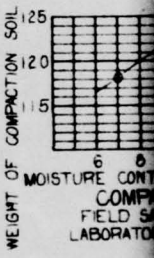


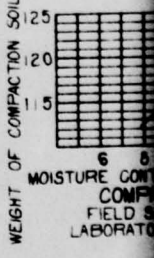
NOTE: 1. Boulders @15.0'; 21.0'.
2. Percolation test @7'.

DH #353, Prin. Spill, Elev. 1820.0









DH #264, Emer. Spill. R. Bank, Elev. 1928.0

- 0.0 — Material F
- 0.6 — Material B (ML & SM)
- 71.5

Samples/blows: RB, RB, 75, RB, 79, RB, 85

DH #265, Emer. Spill. R. Bank, Elev. 1954.0

- 0.0 — Material F
- 0.6 — Material B (ML & SM)
- 46.5

Samples/blows: RB, RB, 66, RB, RB, 65, RB, 101, RB, 79

NOTE: Heavy boulders @20-23'.

DH #351, Prin. Spill. Elev. 1816.3

- 0.0 — Material A (GM-GM)
- 10.0 — Material D (ML)
- 21.1 — Material B (ML & SM)
- 36.5 — Material E (slst)

Samples/blows: RB, 12, 16, 16, 9, 22, 14, 25, 30/0.2, 41, 29, RB

DH #352, Prin. Spill. Elev. 1814.8

- 0.0 — Material A (GM-GM)
- 8.3 — Material D (ML)
- 13.0 — Material B (ML & SM)
- 33.0 — Material E (slst)

Samples/blows: RB, 19, 18, 23, 71, 110, 30, RB, 100, RB, 76, RB, 47, RB

NOTE: 1. Boulders @15.0'; 21.0'.
2. Percolation test @7'.

DH #353, Prin. Spill. Elev. 1820.0

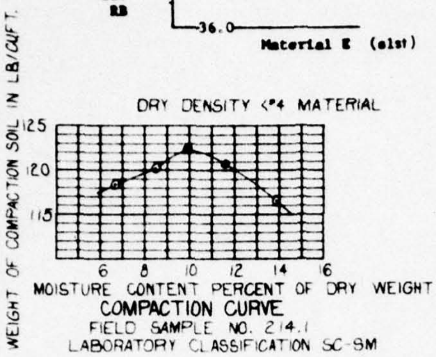
- 0.0 — Material A (GM-GM)
- 7.5 — Material D (ML)
- 15.0 — Material B (ML & SM)
- 35.0 — Material E (slst)

Samples/blows: RB, 40, 22, 19, 32, 29, 25, 17, 82, RB, 108, RB, 75, RB

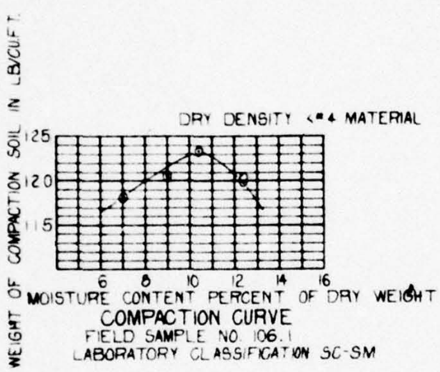
DH #354, Prin. Spill. Elev. 1817.0

- 0.0 — Material A (GM-GM)
- 10.0 — Material B (ML & SM)
- 36.0 — Material E (slst)

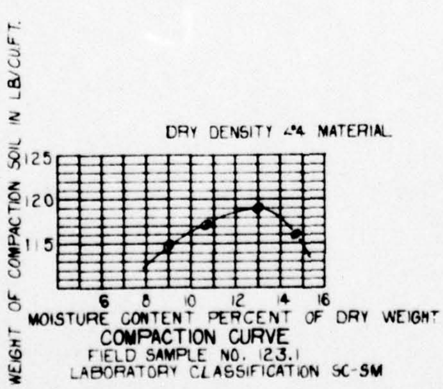
Samples/blows: RB, 40, 84, RB, 48, RB, 67, RB, 52, RB, 127, RB



COMPACTION CURVE
FIELD SAMPLE NO. 214.1
LABORATORY CLASSIFICATION SC-SM



COMPACTION CURVE
FIELD SAMPLE NO. 106.1
LABORATORY CLASSIFICATION SC-SM



COMPACTION CURVE
FIELD SAMPLE NO. 123.1
LABORATORY CLASSIFICATION SC-SM

LEGEND

TEST HOLE NUMBERING SYSTEM

Centerline of dam
[illegible]
Emergency spillway
[illegible]

UNIFIED SOIL CLASSIFICATION SYSTEM SYMBOLS

GW Well graded [illegible]
GP Poorly graded [illegible]
GM [illegible]
GC [illegible]
SW Well graded sands [illegible]
SP Poorly graded sands
SM Silty sands, sand-silt [illegible]
SC Clayey sands, sand-clay [illegible]
ML Silts [illegible] sands [illegible]
CL [illegible]
CH [illegible]
MH [illegible]
OL [illegible] plasticity
OH [illegible] plasticity

NOTE: [illegible]

BEDROCK SYMBOLS

[illegible]
LS [illegible]

SAMPLES

DS Disturbed
[illegible] Undisturbed
[illegible]

KEY TO DRILL HOLE (DH) LOGS

[illegible]

▼ [illegible]

BATAVIA KILL WATERSHED
SITE 1
FLOODWATER RETARDING DAM
GREENE COUNTY, NEW YORK
LOGS OF TEST HOLES

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Logged [signature]	Date 6-68	Approved by [signature]
Drawn		Title STATE CONS. ENGINEER
Traced		Title
Checked A.H.C.	Sheet [illegible]	Drawing No. NY-2484

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Total stress shear parameters of $\phi = 28°$ and c = 650 psf were determined from the data for the test on sample #123.1 (69W143) for test specimens compacted to 95 percent of Standard density. Total stress shear parameters of $\phi = 35°$ and c = 325 psf were obtained from the test data for specimens of sample 214.1 (69W141) at 95 percent of Standard density.

The effective stress parameters were determined to be $\bar{\phi} = 37.5°$ and $\bar{c}$ = 300 psf.

E. Consolidation: A one-dimensional consolidation test was made on a remolded test specimen of the SC-SM sample 214.1 (69W141). The sample was molded to approximately 95 percent of Standard density with the moisture content near optimum and then saturated at the start of loading. The test data shows a consolidation of 3.3 percent under the 8500 psf load of the 65-foot high flood-plain section.

STABILITY ANALYSIS

The proposed 76-foot high class "C" embankment was analyzed using the SCS computer program. The post-construction condition was analyzed using present strength shear values of c = 1240 psf for the varved silt foundation layer and total stress embankment values of $\phi = 28°$ and c = 650 psf. The long term stability of the structure was analyzed using shear parameters of $\phi = 30.5°$ and c = 450 psf for the consolidated strength of the foundation and total stress shear parameters of $\phi = 35°$ and c = 325 psf for the embankment.

The downstream 2 1/2:1 slope yielded a safety factor of 1.31 (Trial #9) for the "immediately-after-construction" condition for the 76-foot high maximum section. The 3:1 upstream slope will have a safety factor greater than 1.31 for the same condition.

The long-term stability analysis of the 3:1 upstream slope under full drawdown conditions gave a safety factor of 1.61 (Trial #1) with a 10-foot berm at elevation 1844. The downstream 2 1/2:1 slope with a drain at c/b = 0.6 yielded a safety factor of 1.75 (Trial #5).

A stability analysis was also made of the interim condition between the post-construction (no consolidation) condition and the long term consolidated condition. Full drawdown conditions were assumed on the upstream slope and no consolidation in the foundation (c = 1240 psf). A minimum safety factor of 1.28 (Trial #10) was obtained for this analysis of the 3:1 upstream slope. The analysis of the interim condition for the 2 1/2:1 downstream slope with a drain at c/b = 0.6. gave a minimum safety factor of 1.32 (Trial #11).

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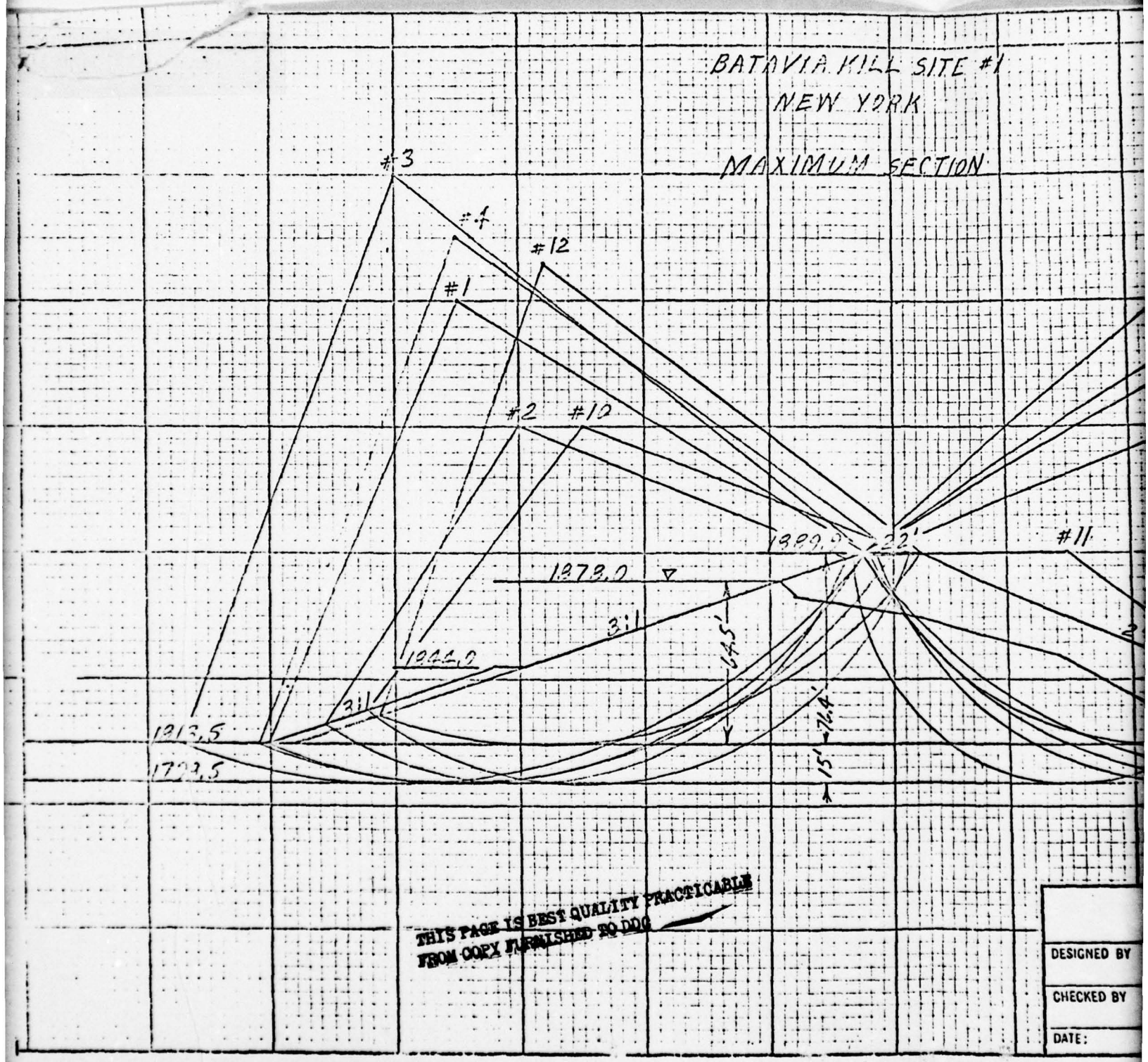
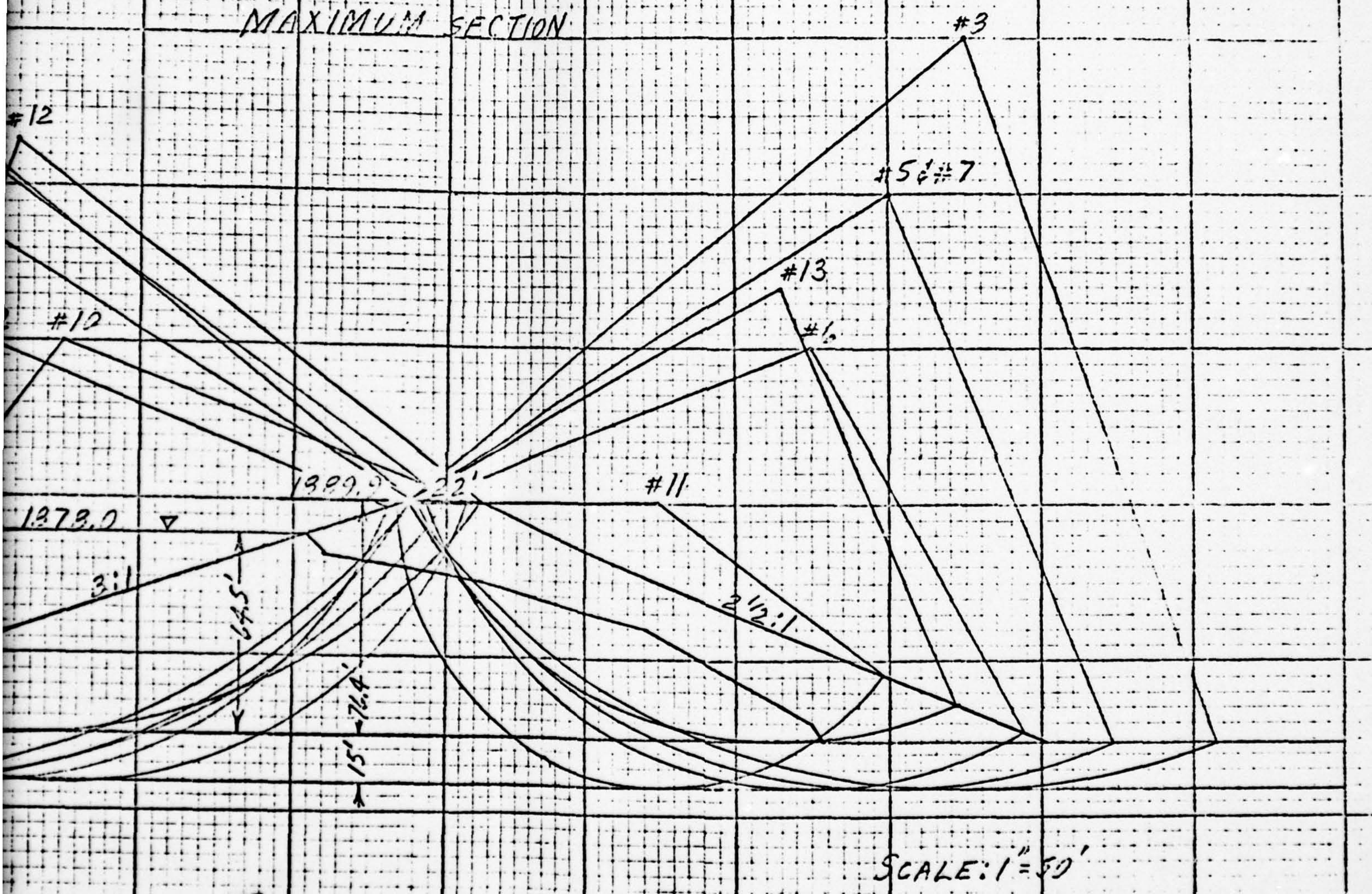


BATAVIA KILL SITE #1
NEW YORK

MAXIMUM SECTION



SCALE: 1" = 50'

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

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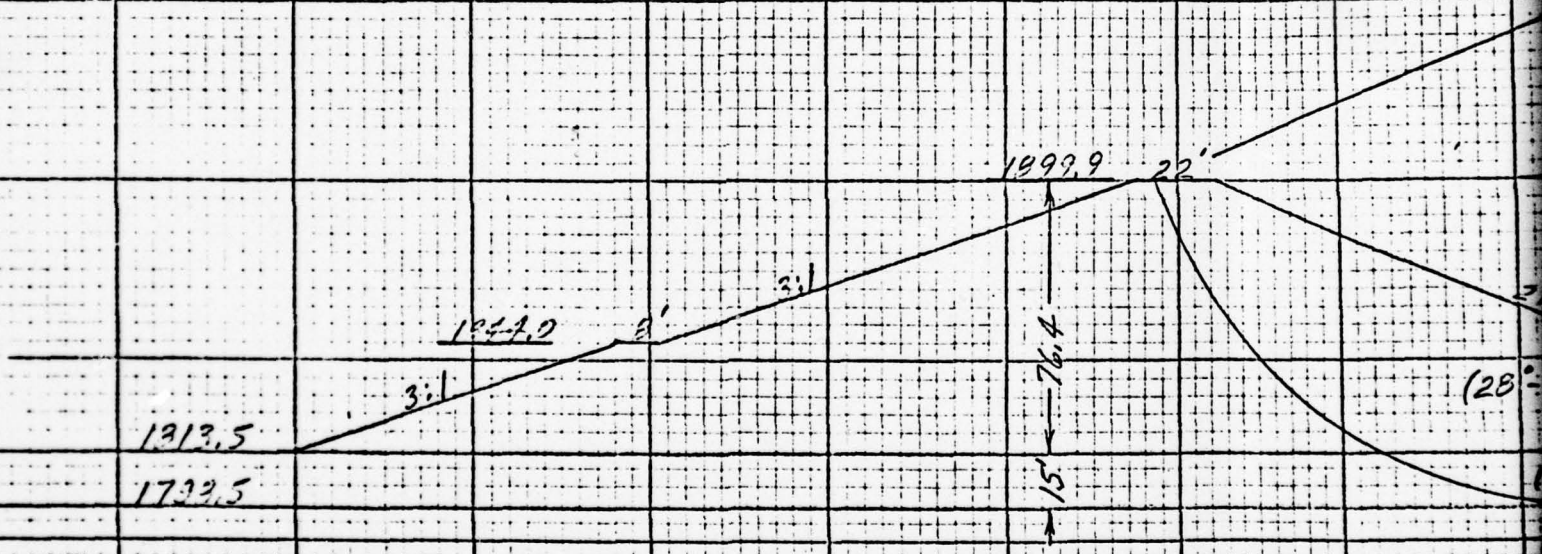
CHECKED BY	DRAWING NO. (Form SCS-357)
DATE: 3-20-69	SHEET 2 OF 3

BATAVIA KILL SITE #1

NEW YORK

MAXIMUM SECTION

IMMEDIATELY AFTER CONSTRUCTION



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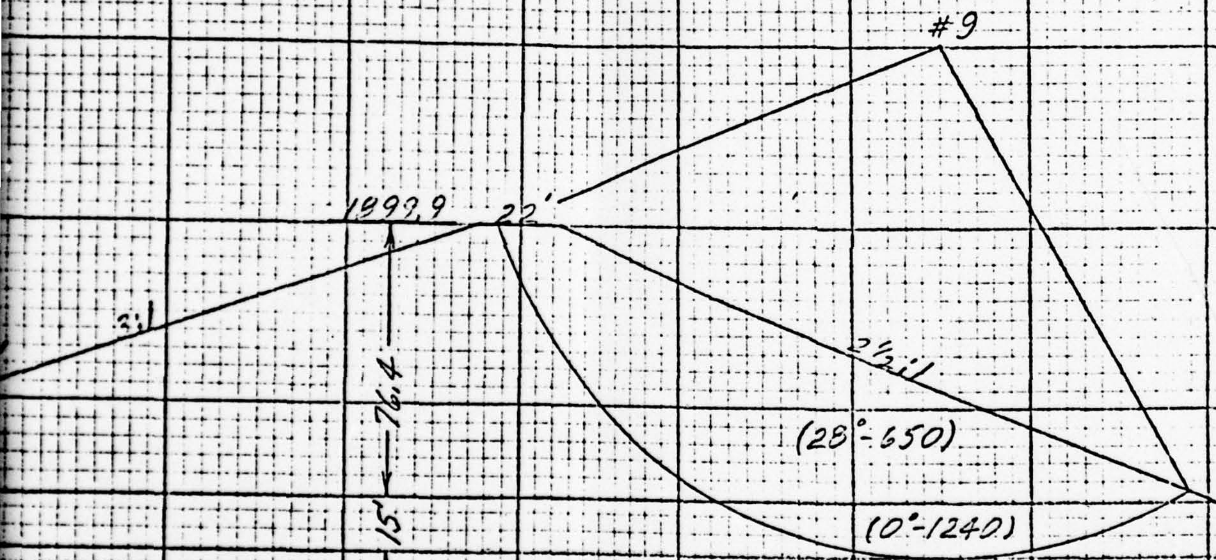
BATAVIA KILL SITE #1
NEW YORK

MAXIMUM SECTION
IMMEDIATELY AFTER CONSTRUCTION



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DATE: 3-20-69	SHEET 3 OF 3

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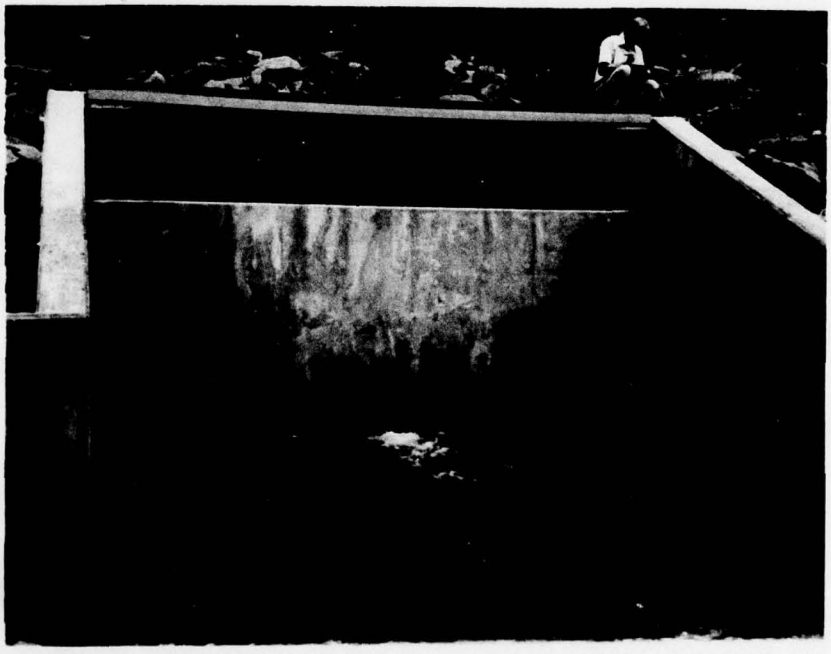
APPENDIX B

PHOTOGRAPHS

SOUTH EMERGENCY SPILLWAY

INLET OF PRINCIPAL SPILLWAY
@ RISER



OUTLET OF PRINCIPAL SPILLWAY
@ IMPACT BASIN

APPENDIX C

ENGINEERING DATA CHECKLIST

P VIA ILL

Check List
Engineering Data
Design Construction Operation

Name of Dam DAM #1

I.D. # NY-615
(#191C-3901)

Item	Remarks		
	Plans	Details	Typical Sections
Dam	YES	YES	YES
Spillway(s)	YES	YES	YES
Outlet(s)	YES	YES	YES
Design Reports	YES		
Design Computations	YES		
Discharge Rating Curves			
Dam Stability	YES		
Seepage Studies			
Subsurface and Materials Investigations	YES		

Item	Remarks
Construction History	
Surveys, Modifications, Post-Construction Engineering Studies and Reports	NONE REPORTED
Accidents or Failure of Dam Description, Reports	NONE REPORTED
Operation and Maintenance Records Operation Manual	N/A

APPENDIX D

VISUAL INSPECTION CHECKLIST

VISUAL INSPECTION CHECKLIST

1) Basic Data

a. General

Name of Dam BATAVIA KILL WATERSHED PROJECT DAM NO. 1

I.D. # NY-615 (#191C-3901)

Location: Town WINDHAM County GREENE

Stream Name BATAVIA KILL

Tributary of SCHOHARIE CREEK ; MOHAWK RIVER BASIN

Longitude (W), Latitude (N) W 74° 10' 36" N 42° 17' 14"

Hazard Category C

Date(s) of Inspection JULY 11, 1978

Weather Conditions CLEAR 70°

b. Inspection Personnel KOCH McCARTY BERQUIST

ISLAM HARMER

c. Persons Contacted H. HERTH (SCS) E. BLACKMER (SCS)

d. History:

Date Constructed 1970-1974

Owner BATAVIA KILL WATERSHED DISTRICT

Designer SOIL CONSERVATION SERVICE (SCS)

Constructed by CHARLES DESCH CONST. CO.
PIN OAK CONSTR. CO.

2) Technical Data

Type of Dam EARTH EMBANKMENT

Drainage Area 6144 ACRES

Height 74' Length 1800'

Upstream Slope 1:3 . Downstream Slope 1:2.5

2) Technical Data (Cont'd.)

External Drains: on Downstream Face N/A @ Downstream Toe YES

Internal Components:

Impervious Core N/A

Drains UNDER DOWNSTREAM SLOPE

Cutoff Type EARTH; TRENCH KEYED TO FOUNDATION SOILS

Grout Curtain N/A

3) Embankment

a. Crest

(1) Vertical Alignment GOOD

(2) Horizontal Alignment GOOD

(3) Surface Cracks NONE VISIBLE

(4) Miscellaneous

b. Slopes

(1) Undesirable Growth or Debris, Animal Burrows NONE

(2) Sloughing, Subsidence or Depressions NONE

(3) Slope Protection SATISFACTORY

(4) Surface Cracks or Movement at Toe NONE

(5) Seepage N/A NOT IMPOUNDING WATER

(6) Condition Around Outlet Structure SATISFACTORY

c. Abutments

(1) Erosion at Embankment and Abutment Contact NONE

(2) Seepage along Contact of Embankment and Abutment N/A

(3) Seepage at toe or along downstream face N/A

d. Downstream Area - below embankment

(1) Subsidence, Depressions, etc. NONE

(2) Seepage, unusual growth NONE

(3) Evidence of surface movement beyond embankment toe NONE

(4) Miscellaneous

e. Drainage System

INTERNAL UNDER DOWNSTREAM FACE OF THE EMBANKMENT

(1) Condition of relief wells, drains, etc. N/A

(2) Discharge from Drainage System NONE

OUTLETS @ ENDWALLS OF THE IMPACT BASIN

4) Instrumentation

(1) Monumentation/Surveys N/A

(2) Observation Wells N/A

(3) Weirs N/A

(4) Piezometers N/A

(5) Other

5) Reservoir

a. Slopes SATISFACTORY

b. Sedimentation N/A

6) Spillway(s) (including tail race channel)

RESERVOIR DRAIN - OPEN ; INTAKE HAD AN ACCUMULATION OF DEBRIS BUT FLOW NOT BLOCKED TO CLOSURE

a. General

b. Principle Spillway 31' HIGH RECTANGULAR RC DROP INLET ; 42" DIA. RC PRESSURE PIPE ; HANGING BAFFLE IMPACT BASIN SATISFACTORY

c. Emergency or Auxiliary Spillway 2 GRASS-LINED TRAPEZOIDAL OPEN CHANNELS IN EARTH CUTS ; ONE EACH SIDE OF THE MAIN EMBANKMENT SATISFACTORY

d. Condition of Tail race channel SATISFACTORY

e. Stability of Channel side/slopes GOOD

MINOR SLOUGHING & SEEPAGE ON BOTTOM TIER OF 3-TIER NORTH EMERGENCY SPILLWAY CUT SLOPE

7) Downstream Channel

a. Condition (debris, etc.) GOOD

b. Slopes GOOD

c. Approximate number of homes 70 INCL. VILLAGE OF MAPLECREST

8) Miscellaneous

9) Structural

a. Concrete Surfaces SATISFACTORY - PRINCIPAL SPILLWAY RISER & RESERVOIR DRAIN INTAKE

b. Structural Cracking HAIRLINE CRACKS @ INTERSECTION OF RISER & 42" PIPE CROWN

c. Movement - Horizontal & Vertical Alignment (Settlement) N/A

d. Junctions with Abutments or Embankments

e. Drains - Foundation, Joint, Face

f. ~~Water passages~~, conduits, ~~sluices~~ JOINT SEPARATION IN 42" PIPE DOWNSTREAM @ RISER; 1ST JT - 1/4" 2ND JT - 3/4"

g. Seepage or Leakage N/A

h. Joints - Construction, etc. _____

i. Foundation _____

j. Abutments _____

k. Control Gates RESERVOIR DRAIN SLIDE GATE - OPERATIONAL BUT SOME DIFFICULTY MANUALLY OPENING IT

l. Approach & Outlet Channels _____

m. Energy Dissipators (~~plunge pool~~, ~~etc.~~) SATISFACTORY - IMPACT BASIN

n. Intake Structures _____

o. Stability _____

p. Miscellaneous _____

APPENDIX E

HYDROLOGIC/HYDRAULIC ENGINEERING

DATA AND COMPUTATIONS

CHECK LIST FOR DAMS
HYDROLOGIC AND HYDRAULIC
ENGINEERING DATA

AREA-CAPACITY DATA:

	Elevation (ft.)	Surface Area (acres)	Storage Capacity (acre-ft.)
1) Top of Dam	1887.0	139.4	3598
2) Design High Water (Max. Design Pool)	1880.3	121.1	2749
3) Auxiliary Spillway Crest	1877.0	112.0	2372
4) Pool Level with Flashboards	N/A		
5) Service Spillway Crest	1844.4	26.0	307.5

DISCHARGES

	Volume (cfs)
1) Average Daily	N/A
2) Spillway @ Maximum High Water	322
3) Spillway @ Design High Water	N/A
4) Spillway @ Auxiliary Spillway Crest Elevation	302
5) Low Level Outlet	81
6) Total (of all facilities) @ Maximum High Water	N/A
7) Maximum Known Flood	273

CREST: ELEVATION: 1887.0

Type: LEVEL; GRASSED EARTH

Width: 21' Length: 1800'

Spillover N/A

Location

SPILLWAY:

PRINCIPAL		EMERGENCY
1844.4	Elevation	1877.0
RC DROP INLET w/ TRASH RACK	Type	TRAPEZOIDAL OPEN CHANNELS
3'-6" x 10'-6"	Width	NORTH - 275' SLOPES 1:3 1:2.5 SOUTH - 120' SLOPES 1:3
Type of Control		
✓	Uncontrolled	✓
Controlled:		
N/A	Type (Flashboards; gate)	N/A
N/A	Number	N/A
N/A	Size/Length	N/A
	Invert Material	MOWED GRASS
	Anticipated Length of operating service	< 1 PER 100 YRS
42" DIA RC CONDUIT - 336'	~~Chute~~ Length	NORTH - 1100' SOUTH - 900'
~~N/A~~ SHARP-CRESTED	Height Between Spillway Crest & Approach Channel Invert (Weir Flow)	N/A BROAD-CRESTED

$L/b = 1.0$

WEIR LENGTH = 19.33'

~~OUTLET STRUCTURES~~/EMERGENCY DRAWDOWN FACILITIES: - RESERVOIR DRAIN

Type: Gate ✓ Sluice _____ Conduit ✓ Penstock _____

Shape : GATE - FLAT CIRCULAR CONDUIT - ROUND CAST IRON

Size: GATE - 24" DIA. CONDUIT - 24" DIA.

Elevations: Entrance Invert 1817.0
(CONDUIT)

Exit Invert 1815.9

Tailrace Channel: Elevation 1807.0
@ IMPACT BASIN

HYDROMETEROLOGICAL GAGES:

Type : NONE

Location: _____

Records:

Date - _____

Max. Reading - _____

FLOOD WATER CONTROL SYSTEM:

Warning System: NONE

_____

Method of Controlled Releases (mechanisms):

N/A EXCEPT FOR RESERVOIR DRAIN SLIDE GATE - MANUALLY
OPERATED

DRAINAGE AREA: 6144 ACRES 9.6 SQ. MI.

DRAINAGE BASIN RUNOFF CHARACTERISTICS:

Land Use - Type: FARM FIELDS & WOODLANDS

Terrain - Relief: LOW TO STEEP W/ STEEPER SLOPES IN UPPER REACHES OF WATERSHED

Surface - Soil:

Runoff Potential (existing or planned extensive alterations to existing (surface or subsurface conditions)

NONE

Potential Sedimentation problem areas (natural or man-made; present or future)

N/A

Potential Backwater problem areas for levels at maximum storage capacity including surcharge storage:

N/A

Dikes - Floodwalls (overflow & non-overflow) - Low reaches along the Reservoir perimeter:

Location: NONE

Elevation:

Reservoir:

Length @ Maximum Pool N/A (Miles)

Length of Shoreline (@ Spillway Crest) N/A (Miles)

BATANIA KILL #1
#191C - 3901

[PMF - 6 HOUR ≤ 10 sq miles]

DRAINAGE AREA
6144 ACRES
OR
9.6 SQ. MI.

4. RUNOFF (10.21)

P = 23, CN = 80 } Q = 20.3 (ins)

CN (SCS) = 78 (USE 80)

5. Hydrograph Family (21.83)

P = 23, CN = 80 } Hydrograph Family # 1

6. Duration of Excess Rainfall (21.85)

P = 23, CN = 80 } T_o = 5.7 Hrs.

7. T_c = 1.34 Hrs. (TIME OF CONCENTRATION)

$T_p = .7\ T_c$

$T_p = .7\ (1.34) = 0.94$ Hrs.

8. $\frac{T_o}{T_p} = 6.06$

9. Revised $\frac{T_o}{T_p}$ (21.59)

Family #1, $\frac{T_o}{T_p} = 6.06$ } $\frac{T_o}{T_p} = 6$

10. Revised $T_p = \frac{T_o}{\frac{T_o}{T_p}\ \text{Rev.}} = \frac{5.7}{6} = 0.95$

11. Compute q_p

$$q_p = \frac{484\ A}{\text{Rev. } T_p} = \frac{484 \times 9.6}{0.95} = 4891 \text{ cfs.}$$

12. Compute Q_{qp}

$Q_{qp} = Q \times q_p$

$= 20.3 \times 4891 = 99287$ cfs

A in Sq Mile

HYDROGRAPH FAMILY # 1 } □ (TABLE 21.17)

REV. $\frac{T_O}{T_P} = 6$

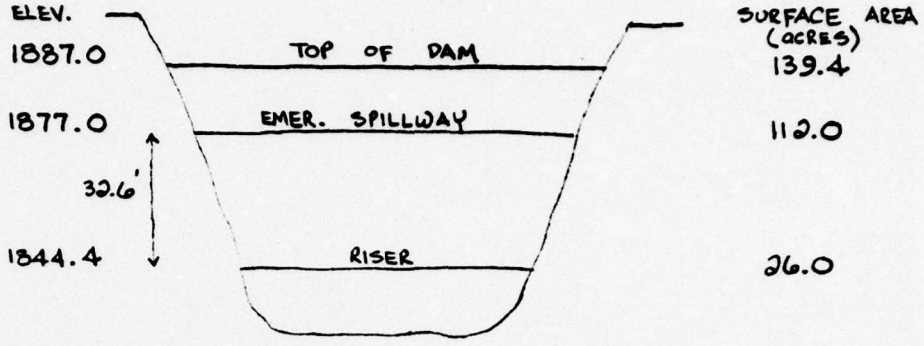
DAM: #191C-3901

②

(21.17) LINE NO.	(21.17) $\frac{t}{T_P}$	(#10) Rev T_P = 0.95 $t = \frac{t}{T_P}(\text{Rev } T_P)$	(21.17) $\frac{q_c}{q_p}$	(#12) Qq_p = 99287 $q = \frac{q_c}{q_p}(Qq_p)$	HYDROGRAPH PEAK INFLOW	REMARKS
1						
2						
3						
4						
5						
6						
7			.386	38325		
8			.497	49346 cfs	*	USE 49350
9			.430	42693		

SPILLWAY ANALYSIS:

HEAD = 32.6'



Reservoir Detention Volume (RDV):

$$RDV = A \times h = \left(\frac{112 + 26}{2}\right)(32.6) = 2249.4 \text{ AF}$$

Inflow Runoff Volume (IRV):

$$IRV = \frac{Q}{12} \times A = \frac{20.3}{12} \times 6144 = 10393.6 \text{ AF}$$

Ratio: $\frac{RDV}{IRV} = \frac{2249.4}{10393.6} = .22$ REDUCTION OF OUTFLOW PEAK RATE

Ratio: $\frac{OPR}{IPR} = .93$

OPR (Outflow Peak Rate) = (0.93)(49346) = 45892 cfs (USE 45900 cfs)

BATAVIA KILL #1

#1912 - 3901

SPILLWAY DISCHARGES: [PMF]

PEAK OUTFLOW = 45892 cfs

PRINCIPAL SPILLWAY = 302 cfs (W.S. ELEV = CREST EMERG. SPILLWAY)

REQ'D IN 2 EMER. SPILLWAYS — 45590 cfs

EMERGENCY SPILLWAYS: ANALYZE AS BROAD-CRESTED WEIR

$Q = CLH^{3/2}$

BOTTOM WIDTH: NORTH 275 + SOUTH 120

$C = 3.087$ $L = 395' = 275 + 120$

$H^{3/2} = \frac{Q}{CL} = \frac{45590}{(3.087)(395)}$

$H^{3/2} = 37.388312$

$H = 11.2'$ (ACTUAL $H = 10'$)

WIDTH	NORTH	SOUTH
TOP	330	180
BOTTOM	275	120
AVE:	302.5	150

$L = 452.5'$

$H^{3/2} = 32.637311$

$H = 10.2'$

DEPTH @ TOP OF DAM:

PEAK OUTFLOW = 45892 cfs

PRINCIPAL SPILLWAY = 322
EMERGENCY SPILLWAYS = 44173
} @ MAX. HIGH WATER

1397 cfs — EXCESS

$Q = CLH^{3/2}$ $L = 1800 + 330 + 180 = 2310'$

$H^{3/2} = \frac{1397}{(3.087)(2310)} = 0.19590602$

$H = 0.3'$

PRINCIPAL SPILLWAY CAPACITY @ MAX. HIGH WATER: (42" CONDUIT - FLOW CONTROL)

ELEV. - TOP OF DAM 1887.0

PIPE OUTLET 1807.0

HEAD = 80.0' (ORIFICE; FULL FLOW)

$$q = A\sqrt{\frac{2gH}{1 + K_e + K_b + K_p L}}$$

A (42" PIPE) = 9.621 ft²

H = 80' L = 336'

$K_e = 0.5$ $K_b = .45$ $K_p = .0078$

$$= 9.621\sqrt{\frac{2(32.2)(80)}{1 + 0.5 + 0.45 + \underbrace{(.00784)(336)}_{2.634}}}$$

$$= 9.621\sqrt{1123.9091}$$

[OUTFLOW] $q = 322.5$ cfs

PRINCIPAL SPILLWAY CAPACITY @ W.S. ELEVATION = CREST OF EMERGENCY SPILLWAYS

ELEV. - EMERG. SPILLWAY CREST 1877.0

PIPE OUTLET 1807.0

HEAD = 70.0' (ORIFICE; FULL FLOW)

$$q = 9.621\sqrt{\frac{2(32.2)(70)}{1.95 + 2.634}}$$

$$= 9.621\sqrt{983.4206}$$

[OUTFLOW] $q = 301.7$ cfs

RESERVOIR DRAIN CAPACITY @ W.S. ELEVATION = CREST OF PRINCIPAL SPILLWAY

1844.4
1813.4
31.0

24" ϕ CAST IRON $n = .015$ HEAD = 31.0'

$A = 3.142\ ft^2$ $L = 89'$ $K_e = 0.5$ $K_b = 0$ $K_p = .0165$

$$q = A\sqrt{\frac{2gH}{1 + K_e + K_b + K_pL}}$$

$$= 3.142\sqrt{\frac{2(32.2)(31)}{1 + 0.5 + \underbrace{(.0165)89}_{1.4685}}}$$

$$= 3.142\sqrt{672.52819}$$

[OUTFLOW] $q = 81.5$ cfs

MAXIMUM KNOWN FLOOD : @ ELEV. 1864.4 DISCHARGE THRU PRIN. SPILLWAY

1864.4
1807.0
57.4 — HEAD

$$q = 9.621\sqrt{\frac{2(32.2)(57.4)}{1 + 0.5 + 0.45 + 2.634}}$$

$$= 9.621\sqrt{806.40485}$$

[OUTFLOW] $q = 273.2$ cfs

DISCHARGE IN EMERGENCY SPILLWAYS @ MAX. HIGH WATER (10' FLOW DEPTH)

$$Q = CLH^{3/2} = (3.087)(452.5)(10)^{3/2}$$

[OUTFLOW] $Q = 44173$ cfs (USE 44178 cfs)

APPENDIX F

REFERENCES

1) U.S. Department of Commerce, Technical Paper No. 40, Rainfall Frequency Atlas of the United States, May 1961.

2) Soil Conservation Service, National Engineering Handbook, Section 4, Hydrology, August 1972, U.S. Department of Agriculture.

3) H.W. King and E.F. Brater, Handbook of Hydraulics, 5th edition, McGraw Hill, 1963.

4) T.W. Lambe and R.V. Whitman, Soil Mechanics, John Wiley and Sons, 1965.

5) W.D. Thornbury, Principles of Geomorphology, John Wiley and Sons, 1969.

6) University of the State of New York, Geology of New York, Education Leaflet 20, Reprinted 1973.